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MANIFESTATIONS OF HYPOTHYROIDISM IN THE LIMITED FIELDS OF MEDICAL PRACTICE*

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Minneapolis

WITH the increasing use of simplified methods to estimate the heat production of the body, the clinician has available a supplementary method of studying disease which is valuable in proportion to the appreciation of all factors that alter such determinations. The chief application of clinical calorimetry to endocrine, particularly thyroid disease, sometimes leads to errors in diagnosis and therapeutic application which would be obviated if broader and more fundamental conception of nutrition were kept in mind. If an analogy from animal biology may be permitted, the marmot decreases its heat production 25 fold upon hibernating. In this instance the extreme lowering of the basal metabolism is related to physical and chemical factors and not primarily to changed thyroid function.

Starvation profoundly affects the basal metabolism. Benedict and associates¹ found in a group of twelve young men on a net available diet of 1,375 calories suddenly reduced from 4,000 calories in three weeks, that the average basal metabolism had dropped 27 per cent per square meter of body surface and that the individuals lacked physical strength and sense of well being. Lusk² states that there is specific reduction of the basal metabolism coincident with undernutrition, an innate protective mechanism. In contrast to this, high calorie and high protein diets tend to increase the basal metabolism. A very low basal metabolism personally observed, approximately minus 40 per cent, was noted in a dispensary patient markedly underweight who was starved on account of a gastro-intestinal condition and who was without thyroid disease. Likewise, an illustration may be taken of the neurotic individual with mucous colitis who cannot or will not

eat sufficient food to maintain normal body weight and who has reduced heat production independent of any thyroid relationship. Inanition in the diabetic, formerly more prevalent, also tends to lower the oxidative processes. Indeed, any study of the basal metabolism of an individual may lose its significance as a therapeutic guide if factors such as inanition are neglected, which often are unrelated to thyroid function. In this connection it is worthy to note the complex of hysterical dysphagia first pointed out by H. S. Plummer and described by Vinson.³ Plummer suggested that during the long period of inanition a light demand for thyroxin results in a disuse atrophy of the thyroid and that hypothyroidism may develop after the patient begins to swallow freely due to inability of the thyroid to furnish secretion enough to care for the increased food intake. Although noted in a rare condition the mechanism described may account for the lowered metabolism in more common forms of inanition. It may also be noted that physical inactivity over appreciable periods of time tends to lower the oxidative processes of the body.

An attempt has been made in this study to evaluate all the possible factors that influence the nutritional state of the individual and not alone the status of the thyroid without unreasoned emphasis upon the laboratory procedure of determining the basal metabolism. In this study, cases with lowered basal metabolism not due to other demonstrable cause who showed favorable therapeutic response to thyroid extract have been designated hypothyroidism. Clinical observations are noted upon thirty cases selected from a series representing all types of thyroid disease seen in dispensary and private prac-

*Read before the Minneapolis Clinical Club, Feb. 20, 1930.

tice. Myxedema is not included. The features of total loss of thyroid function are characteristic and well known even though an occasional patient is found who has drifted for years without detection of the disease. But partial loss of thyroid function presented here under the term hypothyroidism has presented such variations that they seem to be worthy of brief comment. Diversity of clinical pictures would be expected on a physiologic basis when the thyroid is considered as a regulator of oxidative processes which influence all the tissues of the body. Manifestations of thyroid deficiency have been noted with the predominating symptoms falling within the realm of several different fields and should be of interest to a diversified group such as this.

The skin has often given little or no manifestations in this group with partial loss of thyroid function. Dryness and scaliness have sometimes prevailed without the cutaneous and subcutaneous edema or pseudo-edema which characterizes and gives myxedema its name. Experimentally, hair loss may be shown to be due to diminished thyroid function. Indeed, in experimental animals after reduction or loss of thyroid function, hair changes, thinning and dryness are the most striking features. The veterinarians speak of the hairless pig malady in the northwest due to iodine and thyroid deficiency.

Especially interesting has been the relation of alopecia to thyroid function. Thinning of hair and eyebrows is not uncommon in myxedema. Nearly complete alopecia developing in a woman, M. R., aged 48, was associated with retarded thyroid function; the use of thyroid extract continued over a period of some months restored in a large measure the growth of hair. In other individuals in this series, chiefly females, hair changes were noted although not as the presenting symptom. On the other hand, acquired alopecia totalis in one young man had no demonstrable relationship to thyroid function, which was entirely normal. Partial alopecia in men has no demonstrable relation to thyroid function.

One case of scleroderma, C. M., a female, aged 38, showed retarded metabolism and presumably retarded thyroid function without, however, appreciable response to thyroid therapy. In another case, H. S., a female, aged 31, with reduced metabolism, cloasmic pigmentation of the face was markedly improved by the use of thy-

roid extract. Of interest also in this connection was the reported appearance of urticarial lesions in two individuals following the use of thyroid extract. Occasional swelling of ankles has been noted.

Undoubtedly, very important interrelationships known even to the ancients according to Marine⁴ exist between thyroid and ovarian function. Dr. Litzenberg⁵ and others have recently emphasized interference with reproductive function associated with diminished basal metabolism and its treatment by thyroid extract. One individual in this series, H. A. K., a female, aged 30, had definite hypothyroidism with a history of a previous stillbirth and sterility thereafter. Several years later, after normal thyroid function was restored, pregnancy supervened and terminated in another stillbirth; no other cause of which was found by the obstetrician. In the group studied, amenorrhea has usually been associated with other symptoms such as obesity, anemia, and colloid goiter and restoration of normal basal metabolism has at times been followed by the establishment of normal menstruation. Functional dysmenorrhea has not been especially studied but relief was noted occasionally after the use of thyroid extract in hypothyroid cases with other predominating symptoms.

Thyroid surgery has contributed only a small percentage of the cases of hypothyroidism. Remarkable physiological adaptation is shown in that the varying amounts of remaining thyroid tissue function within normal limits in a good percentage of cases with only infrequently the development of hypothyroidism. It would seem that as a rule the tendency has been to take out insufficient thyroid tissue rather than an excess, although that tendency is becoming less and less, and increase in postoperative hypothyroidism may occur. Marked asthenia with low basal metabolism after thyroidectomy has been noted in one case, G. B., a female, aged 20, that did not respond to the use of thyroid extract. Analysis of this case showed inanition rather than overweight, without other signs of thyroid deficiency, and suggested that undernutrition was the basis of the reduced metabolism rather than postoperative thyroid deficiency.

An extreme example of changed nutritional state after thyroidectomy is that of A. R., a female, aged 20, who within one year gained 70 pounds in weight with, however, reduction after

proper diet and thyroid extract administration. A distinct change in the nutritional state of the individual with weight gain without changed diet or habits, combined with diminished basal metabolism, has not infrequently been the indication for the use of thyroid extract. It seems rather paradoxical that of two individuals with weight loss one may show reduced and the other elevated metabolism. Its basis exists in the first instance in the depression of metabolism secondary to inanition; in the second instance to weight loss secondary to the accelerated metabolism characteristic of exophthalmic goiter.

Of interest in psychiatry, one case, D. B., a female, aged 21, with narcolepsy is included in this series, if in that category may be included persistent and repeated somnolence without regard to the appropriateness of the procedure, making effective work impossible. Thyroid extract proved effective in this case. Another similar case⁶ with response to thyroid therapy has been called to the writer's attention. Not infrequently vertigo has been noted—also irritability and impairment of memory.

In the study of underweight children at Lymanhurst School by the writer⁷ there was a tendency for the basal metabolism to be below the average normal. Indeed to the pediatrician who is interested in the basal metabolism of children with nutritional or endocrine disturbance, this study at Lymanhurst and others⁸ indicate that undernutrition tends to decrease basal metabolism and that the overweight child usually has normal basal metabolism. Of course, the above tenet would not hold in the unusual condition in children when exophthalmic goiter is the basis of the underweight. Indeed, in pediatrics especial care should be taken in the interpretation of the reported basal metabolism. In the first place, normal standards available vary appreciably; in the second place, inanition not due to any thyroid or other glandular dyscrasia is associated with reduced basal metabolism; in the third place, the overweight child has been found generally to have a normal basal metabolism. Only comparatively seldom in children has thyroid deficiency been demonstrated as the cause of overweight.

From the standpoint of internal medicine, the problem of unexplained secondary anemia has sometimes had its solution suggested by the discovery of diminished thyroid activity. Response

to treatment has been noted only after the combination of thyroid extract with other anti-anemia therapy. In this connection it should be noted that according to Lusk⁹ the general oxidation of the body is normally maintained in anemia provided the disturbances are not of extreme intensity. In pernicious anemia, when the hemoglobin falls to 20 per cent of normal, the basal metabolism is increased. Secondary anemia deserves study from the standpoint of thyroid function. Case J. V., a female, aged 28, with hemoglobin of 35 and basal metabolism of minus 16 per cent showed marked improvement of anemia after thyroid extract and iron.

Likewise, in that ever present group, chiefly of women, with a low level of energy output, asthenia and weakness, the symptoms are occasionally associated with hypothyroidism. Weakness in the cases studied has been a universal symptom and the only one common to all cases. As a direct symptom of reduced metabolism, increased sensitivity to cold has been of value; heavy clothes and the summer season are appreciated by the individuals with reduced oxidative processes. M. C., a male aged 42, whose basal metabolic rate was minus 13 per cent and whose systolic blood pressure was 104 mms. of Hg. showed definite improvement of rather incapacitating weakness after taking thyroid extract. Attention should be called to the fact that the basal metabolism is usually normal in obesity and that gain in weight is more commonly exogenous than endogenous. The *luxus consumption* or adaptation of the body to an increased metabolism after a large influx of food finally wanes and storage of fat occurs. The increase in weight noted occasionally after lactation has more basis in over-ingestion of food and changed habits of exercise than in lag in thyroid function. Obesity as in cases M. M., female aged 38; C. R. C., female aged 23; W. W., female aged 31; associated with low basal metabolism, responded well to dietary restriction aided by thyroid extract. M. C., a female aged 22, showed a weight 125 per cent of standard on an apparently low calorie intake. Weight gain not due to increased food suggested an endogenous origin although the basal metabolic rate was only minus 4 per cent. The use of thyroid extract was followed by appreciable weight loss and disappearance of unnatural drowsiness.

Of special interest has been the group with colloid goiter associated with diminished basal metabolism (females in the post-adolescent period and also in the third decade of life); cases M. W., aged 17; M. R., aged 25; D. N., aged 21; E. T., aged 28; R. F., aged 24; E. B., aged 21; and A. P., aged 21. Symptoms have been chiefly lack of energy, weakness, and menstrual disorders. Thyroid extract tended to increase the physical efficiency of this group very distinctly; occasionally reduction in the size of the goiter was noted. Some of these individuals have not known vigorous health until check-up for colloid goiter with reduced basal metabolism indicated thyroid therapy. It may also be noted that such therapy became unnecessary after its use for a few months in one case (M. R., aged 25).

The basal metabolic rates have varied from minus 12 to minus 29 except in two cases minus 7 and 4 per cent. Rarely the diagnosis of thyroid lag has been made from the clinical features without reduction of the basal metabolism below the lower limits of normal. It may be assumed that such an individual's normal metabolism had previously been above the average normal limits and that there was actual lowering of metabolism. From the technical standpoint it should be mentioned that, with the apparatus now commonly in use, errors may occur on the minus side, although, if the patient's condition is not basal, the results will be above normal. With the common clinical usage of apparatus measuring oxygen consumption, the technical simplicity should not lead physicians to disregard errors that give inaccurate low results as well as abnormally high results. Leaks about attachments, ineffective valves, and inefficient absorption with soda lime may give inaccurate low results.

The dosage of thyroid extract, Armour's preparation, employed has seldom been less than 1 grain daily and at times given every other day.

The amount has been controlled by clinical course and by the basal metabolism with chief emphasis upon the condition of the patient. Serial determinations of the basal metabolism have been of value in determining the dosage. But no common standard at which to maintain metabolism was set for all cases. Rather it was attempted to determine the level for each individual case.

In conclusion it may be stated that hypothyroidism challenges interest and attention in the limited fields of medical practice and illustrates the universality of physiologic processes. The specific conditions cited in this series of cases with hypothyroidism are alopecia, thinning of hair, abnormal skin pigmentation, sterility, dysmenorrhea and amenorrhea, narcolepsy, asthenia and lethargy, secondary anemia, obesity, asthenia and colloid goiter. In these conditions of changed functions and sometimes of changed structure, study should include the thyroid status, which if sub-normal gives gratifying response to the use of thyroid extract. Attention is also called to technical errors giving rise to false low reports and also to other factors, chiefly inanition, giving rise to reduced basal metabolism unassociated primarily with thyroid disease.

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TIBIAL FRACTURES INTO THE KNEE JOINT*

ARTHUR N. COLLINS, A.B., M.D., F.A.C.S.

Duluth, Minnesota

DESPITE the fact that the knee-joint is the largest joint in the body and that it has a multiplicity of ligaments entering into its structural support, it is still one of the weakest joints. Its vulnerability to attack by extrinsic forces as well as by intrinsic or perhaps torsion forces, places this complex joint in a most interesting light from the standpoint of trauma.

That the tibia receives a large share of the fractures of the lower extremity is well known and while fracture of the upper end of this bone is less common than of the lower end it is nevertheless serious in proportion to joint involvement. In Hartman's review of 335 cases of fracture of the leg, according to Barbilian, thirty-one were of the tibia alone and thirteen were of the upper end of the tibia (3.8 per cent), a much less frequent occurrence therefore than fractures of the other segments of the same bone.

The subject matter of the present discussion will be confined to a consideration of fractures at the upper end of the tibia, the fracture line entering the joint, or, as the French writers express it, fractures of the tibial plateau.

The range is extensive, from the simple one-line fracture, to that of comminution and many lines entering the joint; the fracture may also be compound. Now and then dislocation may be superimposed, though there were no dislocations in this series.

Twenty cases are herein presented, accumulated from the case records at St. Luke's Hospital, the fractures having been treated by other members of the staff and myself during the past four or five years. I wish here to acknowledge the courtesy and coöperation of those staff members who have aided me in this study.

Case 1.—A housewife, aged 68, while running for a streetcar, slipped on the ice and fell forward, striking her right knee. She was unable to walk. On examination she was found to have a comminuted fracture of the right tibia at its upper end, a wedge shaped fragment involving 85 per cent of the articular surface being displaced inward and downward but with the alignment fairly satisfactory. Reduction was ef-

fectured and plaster cast applied. X-ray showed some improvement in the position of the fragment. Her convalescence was uncomfortable. She had continuous aches and pains in her right knee. However, she was up in a wheel chair on the ninth day and on the nineteenth day the record shows she was having less pain. On the twenty-fifth day the plaster dressing was replaced and on the twenty-sixth day she was discharged. The follow-up record shows that four months after the injury she was walking with a crutch and that she had dull pain in the knee, ankle and foot. She was bending the knee to about 50 per cent of the normal but was not yet doing her housework. She was using hot packs and massage for treatment.

Case 2.—A man, aged 53, a collector by occupation, was knocked down by an automobile and was brought to the hospital in shock. Examination revealed a comminuted fracture of right tibia and fibula; also a fracture of left leg below the knee, ankle and foot. X-ray showed a comminuted fracture four inches below the knee joint with the fracture line running upward into the joint, slight displacement but perfect alignment. Supportive treatment only could be given on account of shock, and death occurred. Autopsy showed: (1) gangrene of the left foot; (2) cardiac hypertrophy (425 gms.); (3) passive congestion of the liver (2,300 gms.).

Case 3.—A laborer, aged 37, while scuffling and in an intoxicated condition, sustained a fracture at the left knee. He was admitted twelve hours after injury. There was swelling around and effusion into the joint coupled with pain and inability to extend the knee; also tenderness over the medial proximal end of the tibia. X-ray showed incomplete fracture of the inner condyle of the left tibia starting above the condyle in the joint surface and running outward and downward but not reaching the outer border. There was no displacement. Treatment was not recorded and follow-up was not obtainable.

Case 4.—A housewife, aged 47, jumped from an automobile while it was in motion. X-ray showed a fracture of the outer condyle of the tibia of a compression type, i.e., a portion of the articular surface being pressed straight downward into the upper end of the tibia as though into a softer or pathologic area. Buck's extension was applied for three weeks and followed by a plaster dressing for three to four weeks. No motion was possible until removal of the plaster. The follow-up report three months later states the knee "is sore all the time"; she bends it very little and walking is difficult. Six months later there was a slight limp but no swelling although the knee was painful when she was fatigued. There was enough bending at the knee to allow going up steps but she found it difficult to go down.

*Read at the annual meeting of the Minnesota State Medical Association, St. Paul, Minn., May 13, 1929.

Case 5.—A woodsman, aged 21, received an injury to his right knee when a log rolled off a sleigh against his leg. He was admitted to the hospital complaining of pain and swelling in the right knee and inability to walk on the leg. X-ray showed a wedge shaped fracture at the internal corner of the right tibia about 1.5 inches in each direction. Displacement was slightly outward and upward and the fracture line involved the

the tibia and the fracture line entered the joint. Incidentally there were also compression fractures of the seventh and eleventh dorsal vertebrae. Splints were applied at first and plaster dressing a week later. He was up in a chair in the eighth week and was then discharged. Follow-up report a year and a half later states there was some stiffness of the knee but no swelling. There was no bending for a year but at the



Case 1

Case 2

Case 3

Case 4

Case 5

joint surface. Treatment was by means of a plaster cast reaching to the mid-thigh. He left the hospital on crutches in the fifth week. Follow-up was not obtainable.

Case 6.—A housewife, aged 54, received an injury to her left knee in an auto accident (no details). X-ray showed a simple fracture through the upper part of the left tibia, the fracture line running obliquely upward and forward and entering the joint. The fragment was in perfect position. Treatment consisted of plaster encasement from the ankle to the groin. This was painful and the plaster was replaced. Crutches were allowed on the fourth week. The cast was removed in the sixth week. The follow-up three months later states there was knee stiffness, that the bending was about one-half normal but also that the swelling was troublesome and weight-bearing difficult.

Case 7.—An attorney, aged 50, fell with his automobile over a forty-five foot embankment. He was admitted to the hospital with a compound comminuted fracture of the left tibia, at least five fracture lines running up and down through the upper end of the bone, one line entering the knee joint between the crucial ligament attachments. There was slight outward angulation. His treatment consisted of Buck's extension with weights and plaster casing on the thirteenth day. He was doing some weight bearing in the ninth week. A follow-up obtained four months later stated he had swelling and stiffness and some limping but was improving. Eight months later there was still some limping but no pain. There was some swelling when he was up and about. He could then bend the knee sufficiently to walk and was back to his work at the end of six months.

Case 8.—A janitor, aged 42, was knocked down by an auto, was run over and was picked up unconscious. On admission, there was no deformity but some swelling at the right knee. X-ray showed a comminuted fracture of the right tibia (also fibula). There was slight posterior angulation of the upper fragments of

time of the report he had about half normal flexion of the joint. He returned to work the fourth month after injury.

Case 9.—A landscape gardener, aged 63, fell off a ladder, injuring his left knee but was not admitted for x-ray until two weeks after the injury. At this time the x-ray showed a fracture of the outer condyle of the left tibia with the fracture line running upward into the joint. Callus formation was visible in the film and evidence of an hypertrophic arthritis. He was placed in plaster for five weeks and was allowed up on crutches in the fourth week. Follow-up records that two years later he was walking but had swelling in the knee and some pain and stiffness.

Case 10.—A watchman (formerly a blacksmith), aged 63, was struck by an automobile while crossing the street. X-ray showed a complete fracture of the internal tuberosity of the left tibia, the fracture line running into the joint. Reduction was done under general anesthesia and plaster applied. This was followed by distress from swelling and pain and a new cast was applied. He remained in the hospital nine days. The follow-up report obtained three and a half years later stated there was pain and swelling and stiffness and he was not able to work.

Case 11.—A man, aged 59, was knocked down by an automobile. On admission, the x-ray showed a compound, comminuted fracture of the upper end of the right tibia, two of the fracture lines running into the joint. There was also a fracture of the left fibula. Reduction was done in two hours but an anatomical reposition was not obtained. The plaster case was removed on account of the poor position and Buck's extension and a Thomas splint with a fifteen pound weight were applied. Plaster dressing was delayed until the eighth week because of the open wound. He was on crutches by the fourteenth week and at that time was able to flex the knee to a right angle. He left the hospital at this time. A follow-up report four

years later stated there was stiffness but no swelling and that he has not worked since his accident.

Case 12.—A man, aged 60, a clerk by occupation, was struck by an automobile and knocked against a fence. He was picked up unconscious, but consciousness had returned at the time of admission to the hospital. There had been no vomiting. There was loss of motion of the left leg and swelling at the left knee. X-

later he noticed no difference in function as compared with the uninjured knee. There was no limp, swelling or pain.

Case 14.—A blacksmith, aged 42, was kicked by a horse and thrown down while shoeing the animal. He was admitted with excessive swelling at the left knee and effusion into the joint. X-ray showed a comminuted fracture of the left tibia with the fracture line



Case 6

Case 7

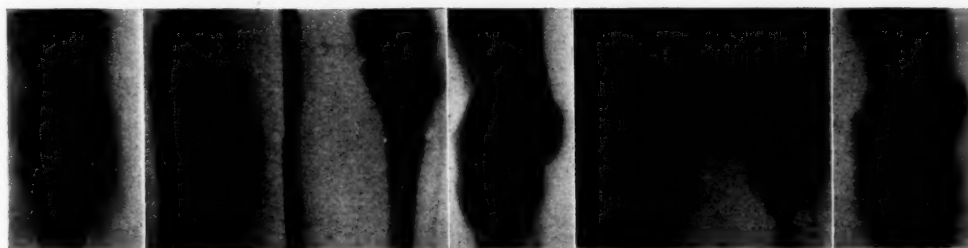
Case 8

Case 9

ray showed a fracture of the left tibia just below the condyles. The fracture was complete and transverse; there was slight displacement and the fracture line ran upward into the joint. The leg was placed in a Thomas splint and on the tenth day a plaster cast was applied after gentle manipulation. Immobilization was maintained for eight weeks and he was then discharged, at which time flexion to 45 degrees was possible. He had moderate pain on motion. Follow-up was not obtainable.

Case 13.—A woodsman, aged 43, had his right leg struck by a swinging log. He was admitted to the hos-

pital running into the joint. The fragments were fairly well related to each other. A Thomas splint was applied with extension and with 45 degrees of elevation. The ecchymosis gravitated into the thigh with compensatory reduction of swelling at the knee. A moulded plaster posterior splint was applied in the fourth week and crutches were allowed. The knee was bent under ether in the tenth week. Weight bearing was allowed in the ninth week. Follow-up report four months later stated the patient was walking without crutches; seven months later he had returned to work shoeing horses; eight years later he had good func-



Case 10

Case 11

Case 12

Case 13

Case 14

pital with swelling at the knee and effusion into the joint. X-ray showed a comminuted fracture of the upper end of the right tibia, the fracture line running upward into the joint. A Thomas splint was applied with extension and 45 degrees of elevation. A moulded plaster splint was applied on the third day. Slight bending to an angle of 15 or 20 degrees was allowed in the second week, and the leg was returned to its splint. The plaster was removed on the twenty-seventh day and crutches were allowed on the thirty-sixth day. Follow-up three months later states he had good anatomical and functional result. Five months later he had returned to work driving a team. Two years

later, no limp but slight stiffness in the left knee. He had no swelling but there was slight pain if he straightened the leg quickly. He noticed an ache in bad weather and noticed the left leg tired more easily than the right. Motion was 50 per cent or better.

Case 15.—A clothes peddler, aged 72, was injured in an automobile accident, no details of which were given. X-ray examination on admission showed a wedge shaped fracture of the external condyle of the left tibia with displacement outward. His leg was placed in a Thomas splint with Buck's extension. Plaster dressing was applied on the fourth day. He was up in a wheel chair in the third week and the cast was re-

moved in the fifth week. Crutches were allowed in the seventh week and at this time physiotherapy was begun. He was discharged in the eleventh week. Follow-up obtained a year later states he was walking; there was slight pain but no swelling and he had 75 per cent flexion. He was able to work in four months.

Case 16.—A housewife, aged 66, stepped out of an automobile, turned her ankle and fell, injuring her

tion was encouraged on the twenty-fourth day. The knee was bent under anesthesia in the seventh week. He was bending his knee to a right angle in the eighth week and was doing some weight bearing in the ninth week. Follow-up three years later states that motion is equal to that on the opposite side and that he won a dancing contest eight months after injury. He had no swelling or stiffness.



Case 15

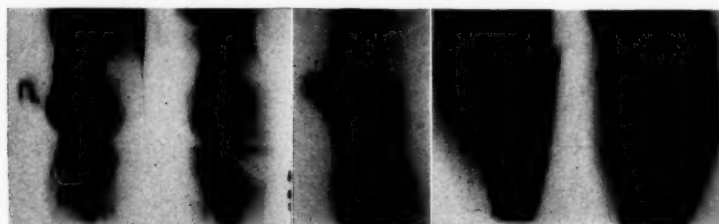
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Case 17

Case 18

right knee. She was unable to walk and was admitted one hour later with much swelling at the right knee. X-ray showed an incomplete longitudinal fracture of the upper end of the right tibia with the fracture line extending downward from the joint for about an inch. There was no displacement of fragments. A plaster dressing was applied in three days but the knee continued to be painful and the cast was cut open and strapped together. She received massage beginning on the tenth day and was discharged from the hospital on the fifteenth day. A follow-up obtained two

Case 18.—A housewife, aged 63, fell while standing on a stool. X-ray on admission showed fracture of the internal condyle of the upper end of the right tibia. The fragment was displaced upward and included both tubercles. The fracture line entered the joint. The leg remained in plaster dressing for five weeks, after which weight bearing was allowed. A follow-up obtained four years later stated that she walked without limp. For two years there was some pain, which, however, had disappeared. The joint was a little thicker but did not swell. There was some limitation of



Case 19

Case 20

years later states that there was no trouble with the knee and that she was walking well.

Case 17.—A printer and dancing teacher, aged 29, was kicked down an embankment by a horse. He couldn't get up and was brought to the hospital two hours after injury to the left knee, where there was much swelling. X-ray showed a comminuted fracture of the upper end of the left tibia. The largest fragment consisted of the entire outer condyle, which was displaced outward. The smaller fragments lay between the outer and inner condyles and were in fairly good position. The entire upper end of the tibia was displaced outward. A Thomas splint was applied and extension with an eighteen pound weight. The leg was elevated on the splint to an angle of about 45 degrees to reduce the swelling at the knee. Plaster dressing was applied on the twelfth day and was bivalved. Mo-

tion but she abandoned her crutches at three months and did light housework at six months after injury.

Case 19.—A laborer, aged 42, was knocked down by an automobile, which also ran over him. He received injuries to both knees and was admitted to the hospital in condition of disorientation and with mumbling speech. X-ray showed: (1) a fracture in the articular surface of the right tibia toward the inner side, the fragment being wedge shaped with the point inward and the fracture line entering the joint; (2) also a fracture involving the entire inner condyle of the left tibia. The fracture line began about 4 cm. below the joint and ran upward into the joint at the intercrural space. The fragment was in perfect position. Details of treatment not given except that he was getting about on crutches at the time of follow-up. The follow-up five months later stated the right leg functioned

normally. The left however caused him to limp and in this knee he had pain. He had swelling on this side also but an attack of typhoid earlier in his life, followed by phlebitis in the left leg, was regarded as a factor in causation of the swelling. Flexion at the left knee was limited to 45 degrees. He had not returned to work.

Case 20.—A man, aged 56, a clerk by occupation, fell from a ladder while working on a roof. He was admitted five hours later with swelling at the right knee and lateral hypermotility. X-ray showed a comminuted fracture of the upper end of the right tibia (also the fibula) with at least two or three fracture lines running upward into the joint. There was moderate separation of the fragments from the shaft of the tibia with a slight backward displacement and angulation. The leg was placed in a Thomas splint with Buck's extension and no weights. A Hawley pin was placed in the heel for skeletal traction. Anatomical position was satisfactory, the temperature was normal and there was no evidence of infection at the time of report. The patient was still in the hospital.

Of the causes producing these injuries, we see on tabulation that the automobile was responsible for eight of twenty (40 per cent). There was no other one cause which approximates this percentage, the next in line being 10 per cent, several different types of accidents producing this percentage.

TABLE I

| Causes of Injury: | |
|------------------------------------|---|
| 1. Knocked down by auto..... | 5 |
| 2. Auto accident (no details)..... | 3 |
| 3. Struck by swinging log..... | 2 |
| 4. Twisting injury..... | 2 |
| 5. Kicked by horse..... | 2 |
| 6. Fell from ladder..... | 2 |
| 7. Fell from stool..... | 1 |
| 8. Fell with auto from height..... | 1 |
| 9. Jumped from height..... | 1 |
| 10. Fell, striking knee..... | 1 |

The injury is one quite evidently threatening those past forty years of age. In these twenty cases all but three were over forty years of age (85 per cent). Men, according to this group, are three times more likely to have the injury than women. There were fifteen men and only five women listed here.

TABLE II

| | |
|--------------------|--|
| Ages..... | 42, 63, 29, 66, 72, 42, 43, 60, 59, 63, 63, 42, 50, 54, 21, 47, 37, 53, 68, 56 |
| Sex..... | M F M F M M M M M M M F M F M F M |
| Right or left..... | RL R L R L L R L R L L R L L R R L R R R |

Both knees were about equally involved, inasmuch as ten of the injuries were of the right knee and nine of the left, while in one man, both knees were injured. This man with both tibiae fractured into the joints, is, so far as I have been

able to find, the only case of this type recorded to date.

None of the cases in this series were treated by open operation and it is a striking and important fact that there are no cases of non-union recorded nor to be found in the follow-ups. This is an interesting disclosure of fact and should afford those treating fractures at the upper end of the tibia courage in instituting early motion. The rich and plentiful blood supply in the cancellous tissue at the upper end of the tibia favors early union, and if the fracture is not compound little fear of infection need exist.

The following table gives in brief the result of treatment.

TABLE III

| | Cases |
|--|-------|
| Unclassified | 6 |
| Cases untraceable, dead, or still in hospital or under treatment. | |
| Poor | 2) |
| Fair | 5) |
| None of these cases received early motion. | |
| Good | 7 |
| Six of the seven cases in this group received early motion or manipulation or massage or all three. In two cases the knee joints were bent under anesthesia. | |

There is undoubtedly significance in the fact that fractures in this region heal well. There has been no instance of non-union. Those cases treated by early motion, massage and manipulation have had the better results.

The Thomas splint is a convenient apparatus in which to transport the patient to the fluoroscopic table where comminuted fragments may be moulded into position. It may be employed in conjunction with Buck's extension.

Barbilian in a comprehensive article reported ten cases and summarized the French literature. The cases he reported were all over forty years of age. He calls attention to the age incidence, which is at a time when the bony elasticity begins to lessen. However, these fractures may be produced earlier in life. Tedenat reported a

case occurring at eighteen years (Heidenreich). My cases were equally divided between men and women, whereas Grimbél found the occurrence almost three times as frequent in men as in women.

Barbilian states that fracture of one tuberosity is more frequent than fracture of both but is nevertheless rather rare. In 1916 Tanton could collect only sixty-three published cases. Fractures of the tibial plateau are only a variety. They are interesting on account of their gravity rather than on account of their frequency. Heidenreich in 1877 collected thirty-nine cases, this being the first complete and well founded work on these fractures of the upper end of the tibia and even today is a classic.

These fractures occur more frequently in winter because of the greater frequency of trauma. The internal tuberosity is a little more often involved, according to Sonntag; twice as frequent according to Bossi.

It is difficult to decide whether the lesion results from the shock produced in falling or from tearing by muscular contraction and pulling on the part of the ligaments. Fracture by direct blow is becoming more and more frequent, due to the greater speed of vehicles, which render trauma more frequent and more violent. Further, one may say that with advanced age one may think of an indirect mechanism, while the younger the individual the more one should consider direct trauma.

Direct fractures are produced by a blow at the superior extremity of the leg: the kick of a horse, crushing by the wheel of a vehicle, a fall down stairs, a fall on the bone itself, etc. In a fall, the instinctive tendency is to touch the ground first with the external side of the foot. This results in abduction of the knee, bringing the articulating surfaces of the internal side closer together; the greater impact is thus at this point.

Barbilian and his co-workers have never been able to obtain true fractures by simple internal or external torsion of the knee joint experimentally. Only small tears resulted in compact tissue. However, if to a certain degree of torsion or of lateral flexion there is added a direct blow at the level of the superior external side of the tibia a fracture could be produced. The force necessary is still much less when there is torsion. This proves that in exaggerated positions, the resistance of the bone is diminished. Without excluding entirely the mechanism of tearing we believe we must admit a mixed mechanism; direct and indirect at the same time.

Segons obtained fractures of the tibial plateau

itself experimentally by simple forced extension in a subject with a rarefied osseous system.

Symptomatology: At the time of the accident the patient feels a very sharp pain but, felled by the blow, is not always conscious of the crepitation of the fractured bone. Functional impotence is added to the pain which every attempt at movement makes worse. The intra-articular effusion of blood infiltrates the soft parts, distends the knee, rising to mid-thigh and descending into the leg. Ecchymosis soon makes its appearance. Its site and limits may be very extensive, is variable, but the infiltration tends to descend and thus become more intense in the popliteal space. The coexistence of this popliteal ecchymosis and the articular swelling should then always indicate a fracture, either tibial or femoral. Deformity should also make one think of a grave lesion. The partial flexion of the leg on the thigh is observed in almost all cases. More important, but less frequent, is the deformity of valgus or varus, according as the external or the internal tuberosity is involved. The valgus knee is observed not only in almost all cases of fracture of the external tuberosity but also in those of the internal tuberosity. To these deformities may be added subluxation of the leg outward by the gliding inward of the femoral condyle and the external rotation of the leg. Relative shortening will occasionally occur.

A symptom which always exists, but which is more or less marked according to the degree of displacement of the fractured segment, is widening of the tibial plateau. This may be noticeable in the absence of effusion but difficult to make out in the presence of effusion. Palpation may permit one to localize the site of fracture. However, great effusion on one side and sharp pain on the other may render palpation very unreliable. A clear, painful line or a palpable groove may correspond to the fracture line in the bone. Mobility of a fragment may be palpated if its fibrous coat is torn. Barbilian states that crepitation is rare because the spongy tissue is unfavorable to its production.

X-rays should always be used to determine the variety of the lesion and to find out the relation of the fragments.

A severe sprain of the knee could be mistaken for a fracture of the tibial plateau; it could indeed present the grave signs of a fracture—intense pain, swelling, functional impotence; but

widening of the tibial plateau and popliteal ecchymosis associated with swelling will eliminate a diagnosis of sprain.

Prognosis: Fractures of the tibial plateau are grave fractures because they are articular. Loss of function in the knee, total or partial, is to be feared. In general, even in the most fortunate cases where complete integrity of function is restored, this is often not realized for a year and a half or two years.

Complications: The most formidable of complications is without question the occurrence of a compound fracture. Late complication is retardation of union which may end in false articulation. Among functional complications the most important is poor recovery of movement, which may amount to ankylosis. Articular function may be impeded by a deforming callus, by lateral motility or by a deformity. Rather often a chronic arthritis supervenes.

Treatment.—1. Orthopedic: This consists of (a) early evacuation of hemarthrosis; (b) reduction of fracture; (c) immobilization for a month; (d) massage and later, mobilization until complete recovery.

2. Surgical: reduction of fracture by arthrotomy through one of the classic procedures and maintenance of the reduced fragments by a definite fixation. Immobilization is of very short duration and is followed by massage and mobilization.

Surgical treatment has not proven the superior method. The spongy bone does not lend itself well to osteosynthesis. Moreover the general state of the patient often does not warrant any surgical procedure. Once accomplished the immediate results of surgical treatment are often more satisfactory but the end-results are not exempt from grievous consequences. Metallic prosthesis is not well tolerated in many cases and infection, which of all complications is to be avoided, may result. In some cases a second intervention is necessary for the removal of the metal.

Non-surgical treatment (orthopedic):

If a perfect anatomic restoration is not always realized by the orthopedic method, a satisfactory function is usually easily obtained.

If the orthopedic method is slower, it is surer.

Articular atrophy and stiffness accompanying the orthopedic method may be lessened, in large

measure, by early massage and mobilization, with expectation of their ultimate disappearance.

Without eliminating surgical treatment Barbilian reserves it for cases where there is great displacement and serious ligamentary tears.

The cases in the Barbilian report show that very satisfactory recovery can be obtained by the orthopedic method and that this method involves less risk.

Desgouttes and Ricard report four cases treated by a simple reduction and immobilization in the cast; results being as good as those obtained by other methods. These writers insist on the fact that the two tuberosities of the tibia have very unequal importance in the equilibrium of the knee, the role of the internal being more important. Fracture of the internal even with slight displacement will be grave, whereas fracture of the external, even accompanied by great displacement, will react but little on articular equilibrium.

These writers urge more frequent use of a simple cast without abandoning necessary surgical means, but they state we hope to accomplish too much by surgery. After-results, which x-rays and examination of the patient do not permit us to hope for, are obtained by simple immobilization.

Dehelly presents a case to show the use of the bone graft and to call attention to immobilization of the leg in flexion in fractures of articulating extremities. He uses partial flexion more and more and regards the results as to mobility as excellent. He feels that when the leg is immobilized in extension almost complete rigidity of the knee often results.

Swete-Evans reports a case of tibial fracture occurring in a private twenty-four years old who while playing Soccer fell with knee bent as his opponent sprang up and came down on the outer side of the patient's thigh just above the knee. The x-ray showed a vertical T-fracture from the knee joint on the outer side of the crucial ligaments three to four inches down the shaft of tibia with pieces of bone and semilunar cartilage or meniscus wedged in the fissure. Treatment was surgical. Arthrotomy was performed and blood and mashed bone expressed; screws were inserted; a McIntyre splint applied; postoperative shock occurred, but recovery. Progress for one year, satisfactory: "will be able to return to military duty."

Cubbins, Conley and Seiffert report two cases of fractures of the lateral tuberosity, the fragments widely heparated and the meniscus separated from its lateral attachment and displaced downward between the fragments. Open operation was necessary in order to dislodge the meniscus and approximate the fragments. The meniscus was sutured back in place. Careful passive motion was begun in two to four weeks. A removable cast was used as support for eight weeks.

Moreau reports twenty-two cases: nine of fracture of the external condyle, two of the internal, five of both condyles and four gunshot fractures of the external and two of the internal condyle. The symptoms were dominated by hemiarthrosis and swelling; suffusion of the limb was not a constant sign. Crepitation and abnormal mobility of the fragment were usually absent. There was absolute functional impairment and weight-bearing was impossible. Joint-puncture was usually employed and sometimes repeated. In one case Willems treatment was instituted. All cases were immobilized in splint or plaster. After a number of days, varying with the joint, massage and active exercises were added. Results: two very good results, without valgus deformity, good motion two months after puncture, compression bandage, continued traction. Two excellent results after one month from puncture and Willems treatment. After simple immobilization; one normal, one satisfactory functional result with slight and moderate genu valgus; three very good functional results without deformity. In five cases of fracture of both condyles, plaster immobilization without puncture; in two cases traction was applied. Results were satisfactory though not so good as single condyle fracture.

SUMMARY

In this serious type of fracture the automobile is responsible in twenty cases for 40 per cent of the injuries and in ten other cases for 30 per cent, an average of 36 per cent. The injury occurs chiefly in men forty years of age or over. Barbilian has shown that a combination of torsion and direct trauma are for the most part responsible for this type of injury.

Two cases of sunken or compression fracture are recorded; one of the writer's series of cases and one reported by Dehelly.

Two cases of spreading or T-fracture with a semilunar cartilage or meniscus wedged in the

fissure are recorded; one by Swete-Evans and one by Cubbins and his associates.

Some writers insist that the internal tuberosity is the more important from a functional standpoint and should be conserved more cautiously than the external.

Barbilian mentions delayed union or non-union as a late complication, but the writer finds no reports of this nature and is inclined to believe, on the contrary, that these fractures heal well, owing to the cancellous bone and rich blood supply.

Early motion in a series of twenty cases is seen to be coincident with the best results, judging by the follow-up reports.

Surgical treatment is reserved for the occasional or exceptional case of gross deformity and ligamentary tears.

The weight of opinion leans to conservative or orthopedic treatment rather than surgical intervention. While a perfect anatomic restoration of position is not always realized by the closed method, and while it may be slower, it is surer.

The writer wishes to emphasize in the closed method:

1. Elevation of the extended leg to a sharp angle (30 to 45 degrees) to rapidly reduce swelling at the knee.
2. Puncture if excessive intra-articular effusion.
3. Buck's extension on Thomas splint.
4. Massage after the first week.
5. Early motion second to fourth week.
6. Removable plaster during the third or fourth week for support and to facilitate treatment.

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EXPERIENCES IN THE USE OF THE SULPHOCYANATES*

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IN recent years there has been decreasing in the medical mind the feeling that hypertension be considered a phenomenon compensatory to structural vascular change, and there has been an increasing knowledge of factors suggesting that it is a primary result of an unknown cause, producing a variety of degenerative changes. Thus Moschowitz¹ has recently strikingly pointed out the relation of arteriosclerosis to increased vascular tension, and the secondary kidney and cardiac results of this condition challenge us to search for measures to combat its underlying cause. While the etiology of hypertension is still unknown, the arteriolar spasm associated with it is well recognized as being for a long period its immediate inciting cause (the etiology of spasm being still undetermined), and the wide search for remedies has resulted in the study of a number of drugs, from the long known nitrites to the recently tried watermelon seed extract, most of which probably act by relief of vascular spasm, with varying results. These observations make evident the encouraging results possible in this form of therapy, the rationale of which is seen in the probable postponement of the secondary cardiovascular and renal complications which are so often the first to call the patient's attention to his condition.

Of the many drugs used, the sulphocyanates were first found to be effective in this condition in 1903 by Paul,² who in experiments comparing the action of iodides with these drugs noted the reduction of blood pressure obtained and used it with success clinically. There appears little further in the literature regarding this therapy until 1924, when Westphal³ called attention to rather remarkable results which he was obtaining with it, only three of thirty-five cases resisting treatment. Since then it has been fairly extensively used in Europe, with few reports from this country. Nichols⁴ has given it a thorough study and extensive clinical trial with excellent results. Kramer,⁵ Gager,⁶ Palmer and Sprague,⁷ and Logefiel⁸ have reported results chiefly favorable. It was with these in mind that

we decided to give the drug a trial on our Ancker Hospital and Dispensary services, and this report covers our experiences with its use in twenty-four cases. It is not with the purpose of drawing definite conclusions from so small a series that this is presented, but rather with the hope of demonstrating the effectiveness of the drug in reducing blood pressure, and especially to point out the variable dosage necessary in different individuals to obtain a result and the possible unfavorable side effects associated therewith.

In this group were eighteen women and six men, ranging from fourteen to seventy-five years of age, with no significant variation in result associated with either factor. There were sixteen dispensary patients and eight hospital patients, the latter, even though ambulatory, securing an average systolic drop of 8 mm. Hg. more than the former, this difference, however, being eliminated after the patients left the hospital.

Following the recommendation of Nichols, backed by an extensive trial, we decided to use the sodium salt, although it was necessary with the first few patients to use the potassium salt with which many had gotten excellent results. Hospital patients were kept in bed about one week and all were given sodium bromide for at least this period to effect any sedative action possible in reducing the pressure. Dispensary patients were permitted to rest ten minutes in the dorsal position before the pressure was taken. Pressures to be given are the averages of at least four consecutive readings with comparatively short intervals between them.

In accordance with Nichols' experience, and contrary to the advice of others, we started with a five grain dose three times daily, but in four of five patients untoward side effects necessitated discontinuance of the drug. Later patients were started on two grain doses, and if no result was obtained in a week to ten days, were given increasing doses, the largest being ten grains. The medicine was continued one to four weeks after a maximal drop was obtained. Four patients were given the potassium salt, eighteen the sodium salt, and two received both salts on sep-

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arate occasions, without any noted difference in the results obtained.

Twenty-two, or 92 per cent of our patients, showed systolic pressure drops varying from 15 to 150 mg. Hg. with the majority obtaining very substantial reductions, the largest group of patients being the seven who showed 50 to 60 mm. drops. Fifteen, or 62.5 per cent, showed diastolic reductions, usually above 20 mm., the greatest being in our youngest patient, where a drop of 100 mm. was obtained.

Only two of the groups failed to show an average systolic pressure reduction, one of these being a tertiary luetic who later developed a substantial reduction on specific therapy, and the other a man with severe kidney damage who could not tolerate our minimal dose. Nine cases, however, had no average diastolic reduction, and there were no particular factors with which this could be associated.

The maximal drop in pressure was recorded at varying times after starting the drug in different individuals, some showing it at three days, others requiring a month, the average being about two weeks. Those requiring the longer time usually took larger doses, the step-up in dosage being made at seven to ten day intervals. Once the pressure was being held down for about a week the drug was discontinued and the lowered pressure was found to persist from a few days to two months. Those who were followed sufficiently long were usually found to respond again on resuming medication. When a result was being obtained it was noted that over-exertion, and domestic, economic and other worry would cause sharp temporary rises in pressure in spite of the medication, a rather frequent situation in the class of patients studied, and it emphasized the importance of the psychic factor and the difficulty in obtaining results where uncontrolled.

Twelve of the twenty-four patients complained of symptoms associated with hypertension, chiefly headache, vertigo, tinnitus, weakness, dyspnea, and abdominal distress. Of these, six were completely relieved of severe headache, five had marked relief and one no relief. This relief, when obtained, was obtained within the first ten days, further medication failing to enhance it.

On the other hand, thirteen developed unpleasant complications. Of these, eight complained of marked weakness, chiefly of the legs and arms; some had vertigo. With the onset of such symp-

toms the drug was discontinued, and after a few days all were relieved of these effects which had been produced on dosages varying from two to ten grains t.i.d.; only one, however, on the minimal amount. This experience was in accord with that of others, but far more striking. One patient developed a severe distressing erythema with intolerable itching which persisted about ten days after the drug was stopped but there was no desquamation as in the only similar case found in literature, that reported by Weis and Ruedeman.⁹ It suggested very much the early form of lesion seen in dermatitis exfoliativa. Most disturbing, however, was the development of toxic psychoses in four patients, with disorientation, hallucinations of sight and hearing, mania, confusion, and ideas of persecution, singly or in combination. Such diagnoses were verified by psychiatric consultation. These caused considerable concern when they appeared, but they lasted only five to seven days after the drug was stopped. They were all in patients to whom it had been necessary to give from seven to ten grains t.i.d. to obtain a desirable reduction, and it is to be noted that as a group they showed the greatest lowering of pressure of the series. It was interesting also that this group maintained a considerably longer period of lowered tension after the cessation of symptoms, without medication, than the rest, all being much more comfortable and free from symptoms for three weeks or longer. These manifestations were always preceded by complaints of weakness, but excepting in one case, were in hospital patients, resting a great part of the time and calling little attention to it. The ambulatory case was one of our first patients in whom we were not certain at first as to the significance of the weakness, the later experience with which made us proceed more cautiously with the drug.

Retinal examination was made in over half the cases, all showing moderate degrees of arteriosclerosis, and two with hemorrhages and exudates, but there was no relation between these findings and the results obtained.

Urinary examinations were all negative except of one elderly patient with much albumin and many casts and pus cells, who later came to autopsy revealing an old extensive urinary tract infection. Phenolsulphonephthalein tests were performed on twelve of the twenty-four cases with greater than forty per cent elimination in two hours in ten cases. In these there

was no constant relation to the degree of response, practically all having marked pressure reduction. Of the other two, one case with no elimination of the dye in two hours obtained no pressure reduction, and the other with a twelve per cent two hour elimination secured a systolic reduction of 50 mm. Hg. and no diastolic reduction. Obviously there was insufficiently advanced renal impairment in this series to draw any conclusions as to a relation between renal function or urinary tests and the result to be expected, although a substantial reduction was obtained in two cases with undoubted advanced renal damage.

Blood examination revealed a moderate secondary anemia in four cases, all of which responded to the sulphocyanate therapy. One patient who obtained no result from the drug had a positive Wassermann reaction and later obtained a drop of 30 mm. Hg. systolic, 18 mm. Hg. diastolic on mercury salicylate medication.

Blood chemistry examination in thirteen patients gave normal values except in one instance, this being a girl of fourteen years, who showed the largest drop in pressure of the series. She showed a urea of 34.3 mg. per 100 c.c., which was reduced under therapy to 26.6 mg., with a corresponding improvement in phenolsulphonephthalein excretion from 34 to 55 per cent in two hours.

Electrocardiograms were done on all patients, fifteen of the twenty-four showing evidences of myocardial damage as shown by T-wave inversion, arborization defects, P-wave abnormalities and arrhythmias, but study revealed no relation of these signs to results obtained from sulphocyanate therapy.

Our experience with the youngest patient, a girl of fourteen years, was sufficiently interesting to warrant a short summary. This child, anemic, markedly emaciated, weighing fifty pounds, was admitted to the hospital complaining of weakness and vaginal hemorrhage, which she had considered the beginning of her menstrual periods, a loss of weight of ten pounds, and failing vision. She also had dyspnea on moderate exertion, nocturia, and headaches of about seven years duration. Examination revealed a moderate cardiac enlargement, low palpable kidneys, marked arteriolosclerotic retinae with hemorrhages and exudate, markedly sclerosed and tortuous radial and brachial arteries, and a blood pressure of 252 systolic, 180 diastolic. She

was found to have no vaginal hemorrhage, a normal pelvis, and a markedly bloody urine. Cystoscopic examination showed the blood to be coming from the left ureter, which was shown by the pyelogram to be greatly dilated, and capped by a bifid pelvis with irregularity of the minor calyces. Repeated observation by urologic consultants failed to bring out a diagnosis of the renal condition. After an initial period of observation she was put on sodium sulphocyanate, five grains three times daily. Within the next ten days she had an initial drop of 80 mm. systolic, 65 mm. diastolic, pressure and the hematuria stopped. This dose was kept up three weeks with marked improvement, the patient feeling well. Hoping to further reduce the pressure, the dosage was increased to 7.5, then to 10 grains, on which she soon developed a convulsion, followed after two days by a toxic psychosis which lasted four days. Associated with this she had an additional drop of 70 mm. systolic, 35 mm. diastolic, which persisted after the clearing of mental symptoms, without medication, which was stopped at the time of the convulsion, during the following month, after which she was discharged, having shown a marked improvement in the anemia, a gain of twenty-seven pounds in weight and having no complaints whatever. We have been unable to follow her since but have learned indirectly that she has had a mastoid operation recently and that her pressure is now back to 200 systolic, it being five months since her discharge. She has had no sulphocyanate since that time.

The other patients developing a psychosis, adults of middle age, two women and one man, all had premonitory weakness preceding the mental symptoms which persisted five to ten days. These patients had systolic reductions of 53, 55, and 55 mm. respectively, and diastolic reductions of 22, 23, and 28 mm. respectively, persisting three, six, and six weeks after the relief of the psychosis. These were the only patients receiving a maximum of five grains, in which cases no psychosis developed.

DISCUSSION

This small series of cases has been of interest to us because it has represented the panorama of development in our knowledge of the sulphocyanates. It has revealed that the drug produced a definite drop in systolic pressure in 92 per cent of the cases, and in diastolic pressure in 62

per cent. Concomitantly it reveals that these drops are not to be obtained without the risk of unpleasant side effects if the drug is to be used in effective dosage. On six grains daily ten of twelve patients secured an average reduction of 30 mm. systolic (only five securing diastolic reductions, averaging 14 mm.). Of these, four developed marked weakness, showing that even with minimal dosage the drug is not without unpleasant side effects. These increase as the dosage is increased, all patients receiving over five grains t.i.d. being affected, with a very real danger of developing a toxic psychosis, which occurred in four of five such patients. It is not possible to say to what degree the possibility of cumulative effects of the drug may enter into the explanation of these symptoms, as no studies of excretion were made, but these observations are very suggestive of it. However, the rapid improvement of those developing toxic psychoses together with the long periods of maintained pressure reduction suggest that some other factor may explain its prolonged effect. The psychoses were quite alarming, being preceded and accompanied by a marked degree of weakness. However, their duration was not long and unusually good results followed in the reduction of blood pressure and general improvement in the patients' condition.

CONCLUSIONS

Recognizing the futility of drawing conclusions from a small observation experience, the following may be better presented as supported impressions.

1. The sulphocyanates are effective in a high percentage of cases in reducing blood pressure.
2. The majority of patients will secure a reduction of pressure on minimal dosage, 6 grains daily, a greater lowering of pressure being obtained by increasing the dosage, but only by raising the risk of securing unpleasant side effects; larger doses, therefore, must be used with extreme caution.
3. Side effects manifest themselves in weakness and dizziness progressing to symptoms of psychosis, as disorientation, hallucinations of sight and hearing, ideas of persecution, and mania.
4. These side effects do not long persist after the drug has been stopped, and leave no after-results.
5. Patients developing side effects on the

whole receive more satisfactory pressure reductions than those who do not.

6. More than 90 per cent of patients having symptoms probably caused by hypertension are completely or markedly relieved by sulphocyanates.

7. The lowering of blood pressure effected by sulphocyanates persists considerable periods of time, up to two months after the drug is stopped, and is explained either by cumulative effects of the drug, or, more likely, some persistent effect on vascular tone.

8. Factors of sex, age, retinal pathology, urinary findings and tests, myocardial damage as shown by the electrocardiogram, heart size or outline as shown by the x-ray, and blood examination as to chemistry, and cytologic and serologic tests revealed no relation to the result obtained which would influence therapy or expected response at all.

9. It is to be emphasized that while the sulphocyanates are efficient drugs to be considered in the treatment of hypertension, they should only be employed where the patient is under sufficient observation so that the administration may be easily controlled, realizing the possibilities of unpleasant side effects which attend its use.

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PERNICIOUS ANEMIA IN THE YOUNG*

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THE occurrence of pernicious anemia during childhood or infancy is perhaps worthy of renewed discussion for reasons other than statistical curiosity. As a result of the intensified studies which have followed the discovery by Minot and Murphy, it is becoming clearer that blood morphology in obscure cases, even when studied by experienced morphologists, is not sufficient for the differentiation between pernicious anemias and anemias of other types. This statement is supported by the views held by Downey,² that the red blood cells alone present no pathognostic morphological picture in pernicious anemia. This apparently is particularly true of anemias during early ages. Further, it is clear that the presence of a well established achlorhydria (histamine test) does not help in the differential diagnosis since achlorhydria is frequently found even in cases of unquestionable hypochromatic anemias. This, of course, does not alter the fact that a diagnosis of pernicious anemia with a persistent gastric secretion of hydrochloric acid might be doubted. Further, it is possible to state that positive response to liver extract therapy is not diagnostic of pernicious anemia. This again does not affect the opinion held by Minot³ that the diagnosis of pernicious anemia should be looked upon with doubt in any case in which there is no favorable response to massive and prolonged treatment with potent liver extract. Thus, in some cases, the diagnosis of pernicious anemia at the present time seems so difficult that one is inclined in the last analysis to rely on the presence of a typical combined degeneration of the ascending and descending tracts of the spinal cord for a definite diagnosis. This statement is hardly modified, but rather supported by the well known existence of cases where the cord changes precede the anemia by several years or the anemia never develops. Somewhat at variance with this view is the standpoint taken by Naegeli⁴ and Downey,² who feel convinced that certain characteristic changes in the arrangement of the lobules or the chroma-

tin and in the granulation of the neutrophilic leukocytes occur with sufficient regularity to make the "pernicious anemia neutrophil" the most valuable single symptom for the diagnosis of pernicious anemia.

Viewing the question of the occurrence of pernicious anemia during infancy and childhood in this light, considerable difficulties arise. The following viewpoint might well be drawn into the consideration in this connection. The familial occurrence of pernicious anemia has been well established, possibly to a degree sufficient to suggest an hereditary factor. One might well expect this hereditary factor to be more marked, or at least sometimes present in cases reported as pernicious anemia in early life. This factor does not seem to have been taken into consideration in the reported cases of pernicious anemia in the young.

It is evident that some of the cases reported in the literature of fatally ending anemias in childhood presented a blood picture identical or closely resembling the blood picture in pernicious anemia. To this group belong the cases described by:

1. *Holz*.⁵—The case of Anna K., aged 11, whose principal complaints were weakness, increasing pallor, anorexia, diarrhea, abdominal pain, occasional fever. She was well developed, well nourished, but did not have the characteristic lemon-yellow hue to the skin. She went progressively downhill until her hemoglobin was around 30 per cent and red blood cells 1,320,000. By the use of a diet and iron injections, she had a remission in which her blood apparently became normal. This condition lasted for six months; then, without any response to therapy, she went again downhill, developed bronchopneumonia, and died. No examination of the gastric juice was made, and no neurological findings suggestive of subacute combined degeneration were noted, but the blood presented a red cell picture which was described by the author as indistinguishable from pernicious anemia.

2. *Von Seth*.⁶—A fifteen year old boy, who complained of weakness, pallor, marked dyspnea,

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and slight general anasarca. For seven months his blood went up and down, but never reached normal, with anasarca increasing in amount. His red count was 650,000, hemoglobin 12 per cent, leukocytes 2,500. He died, and postmortem examination revealed red bone marrow, an enlarged spleen and liver with marked hemosiderosis, dilated heart with normal valves, and bilateral pleurisy.

3. *Andrew Barr.*¹—A sixteen year old boy, who was well developed and well nourished. He complained of progressive weakness of three months duration with increasing pallor of the skin for five months, and, when admitted to the hospital, had a distinct lemon-yellow color of the skin. The subcutaneous fat was well preserved. Never on admission or throughout his illness was glossitis present. He had an achlorhydria, and he ran a slight fever. On admission his blood showed 770,000 red blood cells, 5,600 white blood cells and hemoglobin 22 per cent. Five weeks after admission his red blood cells were 420,000 with a hemoglobin of 10 per cent. Three months after admission he rallied and improved to the extent of 850,000 red blood cells and 23 per cent hemoglobin. This improvement did not continue more than twelve days when he took a sudden turn for the worse and died. No postmortem examination was done.

4. *Zuski*² of the Department of Pediatrics, University of Kyoto.—A case in a nine year old child which was impossible to differentiate from a typical pernicious anemia. The clinical course of this case was progressively downhill to a fatal outcome. The red blood cells showed polychromasia, anisocytosis and poikilocytosis, and there were megaloblasts and normoblasts present in the blood smear. Although there was no remission in this case, the presence of normoblasts speaks against the diagnosis of aplastic anemia. This case is of particular interest in view of the fact that pernicious anemia is extremely rare, if at all present, in the Japanese and Chinese races. From the clinical course, it is doubtful whether this was a case of pernicious anemia, but from the morphological red cell picture, it would not be possible to differentiate from the true pernicious type of anemia.

It is worthy of notice that the clinical picture in these cases is incompletely recorded and that the course of the disease presents certain deviations from the ordinary picture of pernicious

anemia. One only had a characteristic remission; one only had a characteristic lemon-yellow skin; achlorhydria was mentioned once. In but one of the cases is there any mention of a neurological examination. There is only one account of postmortem examination.

To sum up: There are certain cases in the young where the red blood cell picture is indicative of pernicious anemia, but where the clinical course is not characteristic. To decide about the name of this group of cases seems of less importance than clearly to recognize their existence.

In presenting the following two cases attempts have been made to give due consideration to the previous discussion. One patient is alive and making progress; the other is not alive, but autopsy was not obtained.

Case 1.—A young girl, aged 15, was first seen in consultation with Dr. Widen at the Norwegian Deaconess Hospital in Minneapolis.

Present Complaint: Weakness and general malaise of two years' duration; nausea and vomiting for six weeks.

Present Illness: Before the age of ten, she had smallpox and measles, both evidently rather mild. At eleven she started to menstruate, and has been regular ever since, even when her anemia was most profound. When thirteen years of age, she noticed that she tired easily and felt weak most of the time. That summer she was sent to a farm, where she improved to the extent that when the school year started in September, she was able to enter. About Christmas time her symptoms of weakness and general malaise gradually increased until Easter, 1928, when she fainted while walking to church. About this time a definite change in her complexion was noticed. This was described as very pale. In spite of the increase of her symptoms she continued her school work and finished the spring term. That summer, at the age of fourteen, she again went to the farm, but this time there was no improvement. In September she started school again, but at the end of one week she had to stop because of marked increase of general malaise, dizziness, nausea, vomiting and fever. She was put to bed. With rest in bed she improved to the extent that she was able to be up and around. This continued for about two months, and then she took a progressively downhill course with the above symptoms markedly increased. She entered the Norwegian Deaconess Hospital January 19, 1929. No definite diagnosis was made although tuberculosis was considered. After a week in the hospital it was necessary to start feeding her by rectum because of increased nausea and vomiting.

Family history cannot be obtained.

Physical Examination: January 31, 1929: A rather well developed, well nourished, young female, lying comfortably in bed, appearing much older than her actual age. Her hair is prematurely gray. There is a slight icterus of skin and conjunctiva. Eyes react nor-

mally to light and accommodation. Ophthalmoscopic examination shows a few old hemorrhagic spots in both retinae. The discs are very pale, otherwise normal. The tongue is clean, smooth on the edges and atrophic, no soreness present. Tonsils have been removed. Teeth and gums are in good condition. Mucous membranes very pale. Neck shows nothing abnormal. The stage of nutrition is remarkably good considering the duration of the illness. The lungs are normal, presenting a slightly exaggerated type of vesicular breathing. The heart is normal in size and position. There is a systolic murmur heard at the apex. Blood pressure 112/90. The abdomen is normal except for the spleen, which is just palpable at the costal margin. Rectal examination reveals nothing abnormal from the pelvic organs. The temperature while in the hospital varied from 36.6° to 39.8° centigrade.

Neurological Examination: Reflexes are all sluggish. The position sense of the big toe is questionable. Babinski is negative. The patient states that her toes are numb, but objective examination is negative.

Summary of Laboratory Examinations: Blood (January 31, 1929)—Hemoglobin 15 per cent (Sahli), red blood cells 800,000, white blood cells 2,000. Blood smear showed numerous pernicious anemia neutrophils with many myelocytes and premyelocytes, occasional myeloblasts, normoblasts, and megaloblasts, young and atypical monocytes and many degenerating small lymphocytes. The detailed blood study by Professor Hal Downey is as follows:

2/5/29—On this date the blood picture was the most typical of pernicious anemia. Pernicious anemia neutrophils very numerous, but there are not many of the "toxic" type. Myelocytes and premyelocytes very numerous, and there is an occasional myeloblast. Normoblasts and megaloblasts. Young and atypical monocytes and many degenerating small lymphocytes.

2/7/29—Slight polychromatophilia of reds. Normoblasts, but no megaloblasts. Premyelocytes, myelocytes and metamyelocytes are very numerous. Toxic and pernicious anemia type of neutrophil. Young and atypical monocytes.

2/13/29—Marked polychromatophilia. Some myelocytes and metamyelocytes. A few normoblasts. Not very many pernicious anemia neutrophils. Some polymorphonuclears of toxic type.

2/21/29—Last date when smears were made. Anisocytosis, macrocytes and microcytes. No polychromatophilia. No nucleated reds. No myelocytes and only a few typical pernicious anemia neutrophils. There are still a few atypical monocytes and an occasional degenerating small lymphocyte.

In all the above examinations the blood smear showed all stages of hyperchromasia and anisocytosis of reds.

Blood Wassermann negative. Widal negative. Agglutination test for bacillus melitensis negative. Blood urea nitrogen 14 mg. per 100 c.c. blood. Blood sugar 122 mg. per 100 c.c. blood. Icterus index 12, falling to 4 as the patient improved. Gastric secretion after .5 mg. histamine shows a total chloride concentration of

182 mg. per cent, but no free hydrochloric acid and a total acidity of 8. Stool examination revealed nothing abnormal. Urine: Specific gravity varied from 1.014 to 1.022, acid, negative for albumin and sugar. Microscopic examination showed occasional epithelial cells, otherwise negative.

Diagnosis: Pernicious anemia.

Treatment: Because of the patient's critical condition, a blood transfusion was considered, but deferred since previous experience with other cases had given us the impression that the effect of liver therapy is less marked after blood transfusion. The patient was grouped and donor arranged for so that, if necessary, a transfusion could be given without delay. Although the patient was nauseated and vomited, she was given 32 capsules of Stearn's liver extract the first day. She vomited the second dose, but it was repeated. The following day she was given 29 capsules, and she was able to retain them all. She was given 30 capsules daily for the next eleven days, 25 capsules daily for the next six days, 15 capsules daily for the next seven days, then 10 capsules daily for the remaining days in the hospital and was discharged on 6 capsules daily. Seven of Stearn's capsules corresponded to 112 grams of liver. The patient was also given dilute hydrochloric acid with her meals. This was not started at once, but when it was started the patient noted a marked improvement in her appetite. She was given a high vitamin, high caloric diet.

Clinical Course: At first it was hard for the patient to take the capsules, but as the doses she vomited were repeated she soon stopped vomiting. At the end of the third day there was a marked clinical improvement as well as a laboratory response in the form of a reticulocyte increase (Chart 1). After one week there was a definite increase in both the red blood cells and in the hemoglobin and a marked response in the reticulocytes. The patient could start to use a back rest one week after liver therapy was instituted. At the end of three weeks she was up in a wheel chair, taking a few steps at the end of twenty-eight days. She was discharged February 28, 1929, with a hemoglobin of 68 per cent and 3,750,000 red blood cells and was able to walk out of the hospital. She has, up to September, 1929, gained 40 pounds in weight and her face is ruddy and it is not necessary for her to use rouge. In spite of this it has not been possible to bring her hemoglobin above 71 per cent nor her red blood cells above 4,200,000. Up to this time she has received raw liver, Lilly's Liver Extract No. 343, cod-liver oil and iron, and bone marrow and iron, without any further increase in her hemoglobin.

On May 15, 1929, the patient returned to the clinic, complaining of numbness of her feet. As she walks in her home she has a tendency to stumble over the rugs. A complete neurological examination at that time failed to reveal any objective signs of a cord lesion.

The patient was admitted to the University Hospital November 15, 1929, with a hemoglobin value of 22 per cent and a red blood cell count of 1,100,000. The patient during the last two months has admittedly been

careless about keeping up her diet. She has been taking only 4 capsules of Stearn's Liver Extract two or three times a week. From September, 1929, to November 11, 1929, the patient was not under our observation. She states that soon after she began neglecting her diet her weakness and diarrhea gradually returned until the last week in October it was necessary for her to go to bed. She entered the University Hospital with

Case 2.—A. N., a white female aged 18, was admitted to the University Hospital July 9, 1925, and discharged October 28, 1925.

During childhood the patient enjoyed good health. She had no infectious disease except measles at six years of age and was not sick again until April, 1925, when she ate some canned beef. She was in bed at that time for a few days. About the first of May she

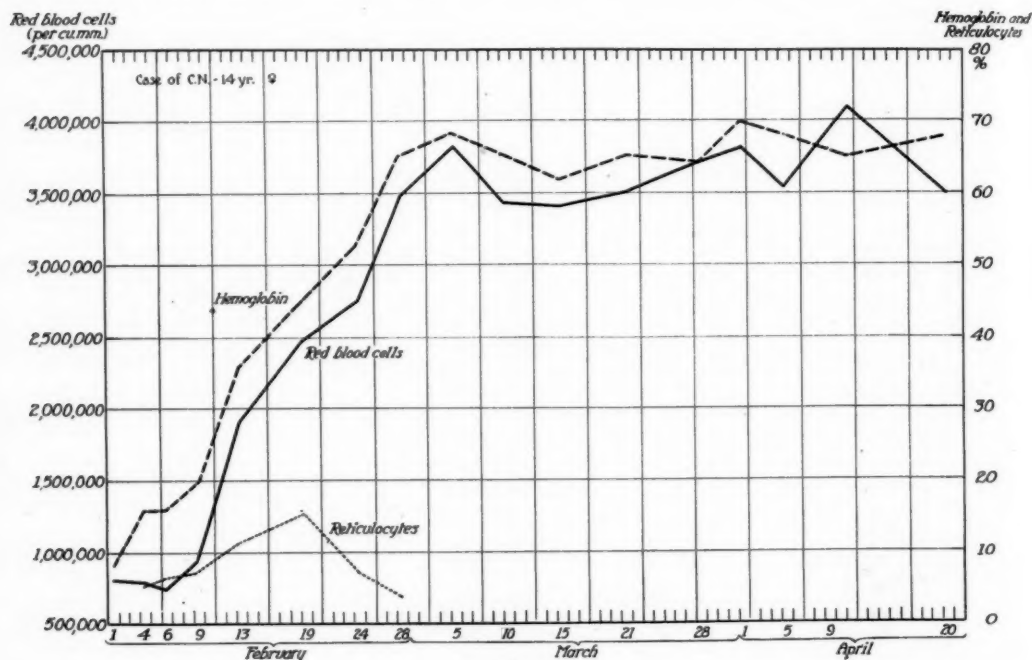


Chart 1

chills and fever caused by an acute sinusitis. The white cell response to this infection was very marked. There was a marked shift to the left with myeloblasts, leukoblasts, promyelocytes and myelocytes. The total white count at the height of her infection was 9,950. Fourteen days later the blood showed a remarkable improvement to the extent that only an occasional myelocyte and pernicious anemia neutrophil was present. There was still anisocytosis and poikilocytosis present. While in the hospital she was given large doses of Lilly's Liver Extract and at the end of three weeks we were able to discharge her with a hemoglobin of 60 per cent and a red blood count of 3,100,000, and she was to receive 6 vials of Lilly's Liver Extract daily for the first week after discharge, and 4 vials daily thereafter. The patient made a remarkable clinical improvement on this short stay in the hospital. The objective neurologic examination on this admission was still negative.*

*Recently this patient has been given linseed oil, 2 tsp. T.I.D., and her liver dosage reduced to 2 vials of Lilly's daily. On this régime the hemoglobin increased to 72% and the red count reached 3,380,000.

noticed that she became fatigued very easily and that she would get more dyspneic when walking fast. It was difficult to keep her hands and feet warm. This continued until one week before entrance into the hospital, when she noticed numbness and tingling in her fingers and toes. She found it necessary to spend most of her spare time resting. About the tenth of May her friends began to tell her that she was getting very pale, but she continued her high school work until May 18, when she stopped because of weakness and went to bed. She stayed in bed until June 8, when she was able to be up and around, but did not have the strength to carry on her usual work. During this illness there were times when her tongue was sore and occasionally she had attacks of epistaxis. Her menstrual history was essentially negative. The family history was negative except for the death of one brother at the age of nine from brain fever.

Physical Examination: Girl, very anemic in appearance, lying quietly in bed apparently in no discomfort. She appears much older than her actual age. She is well developed and well nourished; weight 48 kg. Skin shows a slight icterus. The face appears some-

what swollen, but there is no pitting on pressure. Pupils normal, sclera is bluish-white, conjunctivæ very pale. Mucous membrane of the mouth very pale. Teeth in good condition. Tongue shows an atrophy more noticeable on the borders of the tongue. Tonsils and pharynx show no abnormality. Neck within normal limits. Chest—patient complains of nightly pain over the sternum. This at times is exaggerated by palpation. Lungs show no abnormalities. Heart normal except for a soft systolic murmur at the apex and an accentuation of the second pulmonic sound. Blood pressure 110/50. Abdomen—spleen palpable under the costal margin; otherwise no abnormal findings.

Neurological Examination: The patient gave a typical history of paresthesia of hands and feet, but the Neurological Service was unable to demonstrate any signs of combined degeneration.

Laboratory Examination: Temperature varied from 37° to 38.5° centigrade, and pulse from 80 to 120. Blood examination on admission—20 per cent hemoglobin, 1,080,000 red blood cells, 4,300 leukocytes. Differential count—24 per cent polymorphonuclears, 70 per cent lymphocytes, 4 per cent large monocytes and 2 per cent eosinophils. Detailed blood study by Professor Downey showed numerous pernicious anemia neutrophils with megaloblasts and normoblasts with marked macrocytosis and some poikilocytosis. The blood did not improve morphologically while in the hospital, but there was some improvement up to 35 per cent hemoglobin and 1,520,000 red blood cells. The direct van den Bergh test was negative; the indirect positive and quantitated to 35 units. Examination of the gastric function (Ewald meal) showed an achlorhydria. Wassermann was negative. Blood chemistry normal. Basal metabolic rate within normal limits. Fragility test—hemolysis began at .38 per cent sodium chloride and was complete at .34 per cent. Numerous examinations of the feces revealed nothing abnormal. Parasites or ova were not found. Repeated urine examinations did not reveal any presence of albumin or sugar.

DISCUSSION

Two cases of what might well be diagnosed as pernicious anemia in two girls aged 15 and 18 years have been reported. In the first case the blood morphology was studied in considerable detail by Dr. Madeleine Fallon of this department. Both cases were studied by Professor Hal Downey, particularly the younger and more recent case. The appearance and reaction of the red cells were fully characteristic in both cases. The "pernicious anemia neutrophils" so highly

valued as a diagnosticum by the morphologists, but accepted with a certain hesitancy by the clinician, were present in both cases. The reaction of the neutrophils towards immaturity was of special interest in the younger patient. Though it has long been recognized that particularly during a blood crisis immature neutrophils as far back as myeloblasts appear in the circulation in pernicious anemia, this reaction was unusually dominant during the acute septic infection which prevailed at the second admission of the younger patient. This extensive release of immature forms appears as a rather characteristic bone marrow response in the young.

Clinically striking features in the younger patient are not only her early gray hair, but also her generally early development with a body frame and a development of fat on breasts and hips which usually is not present until fifteen to twenty-five years later.

Achlorhydria was present in both patients.

Subjective neurological symptoms were recorded in both patients, but in both objective neurological signs were missing.

In the older patient no remission ever occurred. In the younger patient one might possibly talk about a remission two summers before the patient came under medical observation. Without liver therapy the end would not have been far off when the patient was first seen. Also it deserves notice that the last relapse came on soon after the first hospitalization and developed rapidly.

It is a point of regret that information as to heredity could not be obtained in either case.

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CONGENITAL SYPHILIS*

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TO the laity, congenital syphilis presents a gruesome picture of horrible deformities, of innocent, unfortunate, yet loathsome things; to the medical profession it presents just another problem in diagnosis and treatment. But truly those afflicted are victims of circumstance, whose chances for normal lives are too often viewed with unpardonable pessimism, never with undue optimism. Congenital syphilis presents itself as a problem to society as a whole, but more particularly and more definitely to the obstetrician, the pediatrician, the internist, the syphilologist and the general practitioner, not to mention the specialist in eye, ear, nose and throat. In brief, upon all of them depend the ultimate decline in the incidence of the disease and the satisfactory treatment and relief of those afflicted with it.

There is ample evidence in the literature to prove that the incidence of congenital syphilis is great enough to insure it an important place, indeed, among the medical problems of today. Minimum figures given by Stokes place the incidence of syphilis in the child population as a whole as ranging from 3 to 5 per cent.⁵ Jeans and Veeder of St. Louis in their own hospital material found 2 per cent among 5,185 new patients—with an incidence of 4.9 per cent in those under one year—latent cases not included.⁴ The Wassermann has shown that many cases without any clinical evidence of syphilis have a latent infection, Wirz having shown that as high as 3 per cent of apparently non-syphilitic babies have a positive Wassermann reaction. Quoting Jeans and Veeder: "It is useless to estimate the number of syphilitic children. We know that there are many more than we estimated a few years ago."

My purpose within the scope of this short paper is to present a series of cases as observed and treated at St. Mary's Hospital, over a period of ten years, and to compare such a study with those reported by some of the larger clinics; but before doing that I should like to summarize briefly some rather interesting points from the literature. 1. The prognosis in congenital

syphilis is generally good as evidenced by statements by leading pediatricians and syphilologists of the country. From Jeans and Veeder comes the encouraging statement: "As well as can be judged in the period since the use of the newer remedies and the more recent method of application, infants who are well treated do not later have any manifestations whatever of syphilis and enjoy as good health as though they never had the disease."

2. The best treatment of the infection is prophylactic, which brings us to the great responsibility which rests upon every doctor who cares for the expectant mother. Out of 1,332 pregnancies in 250 syphilitic families reported in the literature, 22.7 per cent ended in miscarriages and stillbirths, 20.8 per cent in infant deaths, 58 per cent in living syphilitic children and 18.3 per cent living healthy children; among 1,366 living births in syphilitic families 30 per cent died in infancy.⁴ In all, it represents a tremendous toll upon human life—especially significant when it is stated that antiluetic treatment of the mother during her pregnancy will result in non-syphilitic offspring—though this treatment is not by any means sufficient to produce a cure.

3. No matter how late the expectant mother comes to the doctor, it is worth while treating her even though the fetus is already infected. The treatment should not be too intensive and should be governed by the period of gestation and stage of the infection. It should be modern treatment and should include the use of the arsphenamines particularly, with bismuth and mercury as valuable adjuncts. Stokes' outline of treatment in *Modern Clinical Syphilology* is perhaps the best available for reference and should be consulted.

4. Careful histories and routine use of the Wassermann will save many mistakes and go a long way in the battle against congenital syphilis.

5. It is generally conceded by most authorities that infection of the child takes place through the maternal blood stream and placenta—and that the treponema can be recovered from the same.

*Presented at a meeting of the Staff of St. Mary's Hospital, at Duluth, Minnesota. Dec. 5, 1929.

6. The child is probably infected after the third month in most cases, though it may be infected at any time during intrauterine period. The date of the infection, its virulence and extent of the mother's defense mechanism may determine whether the infection after birth will be a far advanced, infantile or tardive form.

There are, briefly, three types of congenital syphilis: (1) fetal and syphilis of the newborn; (2) infantile or early congenital syphilis; (3) late or tardive congenital syphilis.

The first type is the one which results in death in the embryonal stage, in the fetal stage, at birth, or shortly after—a few hours to a day or two. The diagnosis is made on the appearance of the placenta but best upon the basis of finding the spirochetes in the organs of the fetus. Pathologic examination of the placenta and study of the fetus by a pathologist is recommended in every case, along with family investigation and maternal and fetal Wassermanns. Careful investigations and study will lead to the diagnosis and treatment of the mother and the protection of all subsequent pregnancies. Therefore, it is, from the standpoint of preventive medicine, the most important type to recognize.

The second type, or infantile congenital syphilis, represents a very interesting but frequently very discouraging picture of the infection. The blood Wassermann, which is negative in 37 per cent, weakly positive in 18 per cent, and strongly positive in only 45 per cent, according to Stokes, cannot be relied upon absolutely for the diagnosis. Certain authors do maintain, however, that all syphilitic infants have strongly positive Wassermanns after the first few weeks or months of life. In the small series of ten cases observed here, 80 per cent were strongly positive. The stigmata were fairly marked in 80 per cent of the cases and entirely absent in 20 per cent; but in the latter the Wassermann reaction was positive. The following table taken from Stokes⁵ summarizes fairly well the chief symptoms to be kept in mind at all times when observing the infant:

SUMMARY OF CHIEF SYMPTOMS OF INFANTILE CONGENITAL SYPHILIS

Eruption—Rare before third week, distribution distinctively to face and mouth region, the anogenital region, and palms and soles; macular, maculopapular, secondarily eczematous and often

infected. Condylomas and mucous lesions. Pemphigoid bullæ, 10 per cent.

Snuffles—As common as eruption and as early. May be mild and not distinctive; almost diagnostic if hemorrhagic.

Hacking of Lips—Fissures, especially of the upper lip and middle of the lower.

Rhagades—Infiltrative, fissures, eczematous involvement of cheeks, and chin near the commissures.

Enlarged Spleen—Almost diagnostic before the fourth month.

The Cry—Cracked and aphonic. Very suggestive.

Pseudoparalysis—Flaccid of upper extremity, spastic of lower, presumably due to painful movement, but may be neuritic; due to osteochondritis and epiphysitis.

Osteochondritis, Chondro-epiphysitis, and osteomyelitis—Palpable enlargement and tenderness of ends of long bones, single or multiple; most often there may be a fusiform involvement of shaft of the bones in the upper extremities.

Saddle Deformity of Nose—The sequel of the osteitis and gummatous changes in snuffles.

Pulmonary, Hepatic, Marasmic Symptoms—Less common.

The series in the venereal clinic here is so small that any conclusions are unreliable, but I have included in the next table the admittance signs and symptoms as they were casually observed. More detailed examinations at the time, in all probability, would have revealed many more.

10 Cases of Infantile or Early Congenital Syphilis

1. Snuffles, 6.
2. Hydrocephalus, 2.
3. Hacking of Lips, 1.
4. Paronychia, 1.
5. Osteochondritis, 1.
6. Rhagades, 1.
7. Papular Lesions (Syphilides), 2.
8. Chancre on Tongue, 1.
9. No stigmata at all, 2.
10. Positive Blood Wassermann (first), 8.

The third type, the late or tardive syphilis, comprises the majority of the cases of congenital syphilis seen in this clinic, and is the most interesting of all congenital syphilis because of the diversity of its manifold signs and symptoms.

Again, because of lack of time, I am confining myself to a summary and comparative study of the incidence of these signs and symptoms in our series and that of Jeans and Veeder of St. Louis, with a comparison also of the most common signs and symptoms in a series of 202 cases reported by Stokes. I am sure that more of the

conditions listed by this author would have been covered in the cases here if a careful study had been made with aid of the x-ray and spinal fluid analysis.

The reader will note the striking incidence of the eye lesions, particularly the interstitial keratitis, which in turn indicates the important part

| Comparative study of signs and symptoms in late syphilis—% incidence. | | 100 Consecutive St Louis Admissions at Children's Hospital | 50 Cases Reporting to Venereal Dis- ease Clinic at St. Mary's Hospital, Duluth | 202 Cases Reported by Stokes |
|---|--|--|--|------------------------------------|
| 1. Bones | | | | |
| a. Periostitis Tibia..... | | 4 | 4 | 43 |
| b. Periostitis Skull..... | | 1 | --- | --- |
| c. Osteomyelitis | | 1 | --- | --- |
| 2. Joints | | | | |
| a. Acute arthritis knee..... | | 8 | --- | 2 |
| b. Acute arthritis ankle..... | | 1 | --- | --- |
| c. Acute arthritis elbow..... | | 1 | --- | --- |
| d. Chronic synovitis knee..... | | 1 | 2 | --- |
| 3. Skin | | | | |
| a. Gummata | | 3 | 2 | 6 |
| b. Alopecia | | 3 | --- | --- |
| 4. Eye | | | | |
| a. Interstitial Keratitis..... | | 25 | 50 | 52 |
| b. Choroiditis | | 1 | --- | 8 |
| 5. Ear | | | | |
| a. Deafness | | 1 | 2 | 10 |
| 6. Ulcerations | | | | |
| a. Nasal | | 2 | 6 | 30 |
| b. Laryngeal | | 1 | --- | --- |
| c. Pharyngeal | | 1 | --- | --- |
| 7. Central Nervous System | | | | |
| a. Cerebrospinal syphilis..... | | 14 | 14 | 26 |
| b. Hemiplegia | | 6 | 2 | --- |
| c. Epilepsy | | 5 | --- | --- |
| d. Spastic paraplegia..... | | 4 | 4 | --- |
| e. Old Hydrocephalus..... | | 2 | 2 | --- |
| f. Optic Atrophy..... | | 1 | --- | --- |
| g. Mental deficiency..... | | 16 | 22 | 25 |
| 8. Miscellaneous Conditions | | | | |
| a. Ozena | | 1 | --- | --- |
| b. Enlarged spleen (only sym.)..... | | 1 | --- | --- |
| c. Enlarged epitrochlears (only sym.)..... | | 1 | --- | --- |
| d. Obscure abd. pain..... | | 1 | --- | --- |
| e. Obscure muscular pain..... | | 1 | --- | --- |
| f. Obscure pain in legs..... | | 2 | 2 | --- |
| g. Endarteritis obliterans..... | | 1 | --- | --- |
| h. Paroxys. hemoglobinuria..... | | 1 | --- | --- |
| i. Raynaud's Disease..... | | 1 | --- | --- |
| j. Hutchinson teeth..... | | 4 | 14 | 30 |
| k. Enamel defects of teeth..... | | 2 | 6 | --- |
| l. No teeth at all..... | | --- | 6 | --- |
| m. No stigmata..... | | --- | 8 | --- |
| 9. Serologically | | | | |
| Pos. W. R. (First)..... | | --- | 66 | 66 |

which the doctor plays who specializes in eye, ear, nose and throat. In this connection it might be mentioned that the anti-syphilitic treatment in the presence of an interstitial keratitis should always be done with the coöperation of an ophthalmologist if possible. I was interested to note in an account by Ehlers³ on the fight against congenital syphilis in Scandinavian countries that the incidence of interstitial keratitis was given as 60 per cent; and that the complete Hutchinson triad was observed in only two cases during the author's sixteen years of observation.

Now we pass over to consider for a moment the treatment employed in congenital syphilis; and summarizing the treatment, including that employed by Stokes, Jeans, and Veeder, and of Dickey and Sutton of California, the following conclusions may be drawn:

1. The arsphenamines, either arsphenamine or neoarsphenamine, are to be preferred. They are best given intravenously when that method of administration is practicable.

- (a). The dose of arsphenamine employed is .025 at two weeks to 0.1 gm. from six weeks to two months. The dosage in older children is based on the child adult ratio, according to the case. (Jeans employed .01 gm. per Kg. body weight.)
- (b). Neoarsphenamine, which may be used intramuscularly, is given in doses of 0.2-0.3 gm. by Stokes in the one to two year period. (Jeans used .015 gm. per Kg. body weight.)
- (c). Sulpharsphenamine is used by Sutton and Dickey because it can be given intramuscularly without irritation. Dose .015 gm. per Kg. body—increasing to .03 during first eight injections.

In the clinic here the sulpharsphenamine was used intramuscularly in doses of .015 to .03 gm. per Kg. body weight, until the child became old enough to make intravenous therapy practicable. Then neoarsphenamine in amounts bordering on adult doses .1 to .4 gm. was used in practically all cases.

Intravenous administration was conveniently employed at four years in a number of cases coming in at that age. Neoarsphenamine was not used intramuscularly because of the marked irritation which results in many cases.

2. Bismuth in the form of bismuth phenylformitate in doses of 15 mg. per Kg. body weight is used in preference to mercury by Sutton and Dickey.² Bismuth in form of Bismogenol is preferred over mercury also by Dr. H. E. Michelson at the University of Minnesota.⁶ Bronson at the New Haven Dispensary used potassium bismuth tartrate in dose of 0.1 gm. regardless of age.¹ This author, in a series of thirty-one cases treated, stresses the value of bismuth in children because: (1) it is well tolerated; (2) it can be used effectively in those cases intolerant to arsenic; (3) it proved particularly favorable in the cases of interstitial keratitis and syphilis of the central nervous system, treated.

The experience of the St. Mary's Hospital clinic with both bismuth potassium tartrate and the salicylate in dosage of 0.1 gm. has been very satisfactory.

3. Mercury in the form of the bichloride in doses of approximately 5 mg. per Kg. body weight for infants (Sutton and Dickey) or .03 c.c. of a 1 per cent solution per kilo. of body weight (Jeans), is used by a number of writers. Mercury rubs, in the form of the official Unguentum Hydrargyri .05 gm., is still advocated, but particularly in infants. Stokes uses the rubs in doses of 1 gm. in young infants to 4 gms. in older children once daily. Jeans likes to use metallic mercury in finely divided chalk in dosage of 1/5 gr. t.i.d. for young infants to 2 gr. or more t.i.d. for larger children; but most of the other writers do not. Mercury succinimide in doses of 1/20-1/4 gr. is used more than any other form in this clinic and seems particularly well tolerated, convenient and effective in the younger children.

4. Potassium iodide in doses of 3-7.5 grains t.i.d. by mouth is advocated in cases of painful periostitis, but is not advised routinely.

5. The basic routine was alike in most respects, and provided for weekly injections of one of the arsphenamines for six to eight doses in a series, a short rest with or without mercury rubs at home, and ten to twelve injections of bismuth or mercury to a series. Intensive, persistent treatment, bordering on adult ratios, was the tendency here, at the University, and with Stokes.

The extent of the treatment is variable; but practically all agree that thorough treatment is byword in congenital syphilis. If active signs of

the infection are present intensive treatment is indicated until such signs disappear and the Wassermann reaction is negative (if latter is possible). At best this will probably mean two years, and frequently longer in the late cases. After this the patient should receive at least moderate treatment over as long a period as possible. By moderate one should include a minimum of two courses a year of bismuth or bismuth and mercury alternately with an occasional series of neoarsphenamine. Dr. H. E. Michelson believes that a congenital luetic should be treated for at least five years and kept under careful observation as long as possible. The policy in our clinic has been to give intensive persistent treatment as long as possible, with the clinical results used largely as the criterion, and the Wassermann reversal as a desirable end-result. Whenever possible, the cases are followed through puberty, the treatment being increased rather than decreased throughout adolescence.

Spinal fluid analysis is advocated by Jeans if no results are obtained from the treatment in six months to a year. Intraspinal therapy (technic similar to Swift-Ellis) may be used in selected cases of cerebrospinal syphilis.

The final basis for discharge in most clinics is a negative spinal fluid and a careful neurological examination. Spinal fluid analysis has not been required in most of the cases in our clinic because they are carried through to maturity under treatment anyway.

In discussing the results obtained generally in the treatment of congenital syphilis, one must admit that they in the main are encouraging. Stokes reports results more favorable than most others, in the following: 82 per cent of 170 cases achieved a good clinical result and 62 per cent a serologic reversal to negative. White and Veeder of St. Louis after evaluating their results over a period of many years give the following: from a total of 208 cases 22 per cent cured or recovered, 35 per cent improved, 17 per cent unimproved and 25 per cent died. In Denmark, where the congenital syphilitic children are received in special asylums, Ehlers reports the ultimate fate of the first hundred children discharged, as follows: 22 per cent died, 37 per cent developed like normal individuals, 28 per cent were backward and showed retarded development and 13 per cent became imbeciles. The mortality in these reports is not given in age

groups, but it is probably true that a large percentage are the early fulminating cases where infections of the lung play an important part.

Our results here have been highly satisfactory from a clinical standpoint; much less so from a serological standpoint. In the series of sixty cases, a reversal of the Wassermann was obtained in only 20 per cent; but out of twenty negative on admittance, nineteen remained so under intensive treatment, which leaves a total of 50 per cent persistently positive. Some of these cases have been under treatment but a short time and more reversals may be expected in time. In twelve of the cases of persistently positive Wassermann reaction, bismuth has been used extensively over a number of years along with the neoarsphenamine in hope of reversing the test, without results. Two of our cases died, one of tuberculous meningitis and the other was suspected of having tuberculosis but no post-mortem was obtain to verify this. Four of the sixty-one cases were just recently placed under treatment and eight were either transferred to private doctors, or left the city—leaving forty-seven. Of this number all but four have achieved a good clinical result. Twelve cases have to date been carried through puberty, are apparently cured, and show no evidence whatever of having ever been afflicted with congenital syphilis. In a personal communication with Dr. H. E. Michelson, I was able to learn that in his experience with congenital syphilis the clinical results have been very satisfactory in the main; and the serological much less so.

As 50 per cent of our cases here have been under treatment for four years or longer and some as long as ten years, I have endeavored to bring before you, as evidence of our success, as many cases as possible. These are not picked cases; in fact several of our best are holding good positions in the city and were afraid to come here despite the assurance that only the illustrious staff of St. Mary's would be present:

Case 1.—L. W. is a female baby now one year of age who was brought to the clinic at two months of age with florid rickets, large head, marked snuffles, fissures of hands, feet and mouth; and was then scrawny and appeared quite toxic. The Wassermann reaction was Kolmer positive. Because of the marked activity of the syphilis, the baby was given twenty mercury rubs followed by a rest of three months. Since then it has been on sulpharsphenamine intramuscularly. As you see it now the snuffles have completely cleared up, there

has been a marked gain in weight and sufficient body development to offset the previously large head. Its teeth are erupting normally and the rickets is apparently controlled.

Case 2.—F. S. is a twelve year old girl, who was admitted to the clinic without previous treatment one year ago with a marked bilateral interstitial keratitis. She was markedly underdeveloped and undernourished; but apparently was not retarded mentally. There was considerable scarring from previous fissures about the nose, mouth, anus and vagina. The Wassermann was Kolmer positive. Her treatment has consisted of mercury succinimide largely, with neoarsphenamine intravenously. As you see her now there has been a marked gain in weight and some developmental improvement. The keratitis has receded and the child seems quite well. We hope to prevent a recurrence and will give the patient the benefit of continued treatment, including bismuth.

Case 3.—B. K., a female, aged 5, was admitted to the clinic at the age of 3 months with marked snuffles, hydrocephalus, and in a state of undernourishment. The Wassermann reaction was Kolmer positive, and has remained persistently positive in spite of the following treatment:

- Course 1.—24 mercury succinimide (.05-10 gr.)—1 month rest.
- Course 2.—6 neoarsphenamine and 24 mercury succinimide—1 month rest.
- Course 3.—6 sulpharsphenamine and 24 mercury succinimide—1 month rest.
- Course 4.—12 sulpharsphenamine and 24 mercury succinimide—1 month rest.
- Course 5.—12 sulpharsphenamine and 15 bismuth potassium tartrate (.1 gm.).

As you see her now, the large head is not noticeable because the body development has literally "caught up" to the head. The child walked and talked at the normal age; her teeth developed and she seems quite bright mentally.

Case 4.—O. C., a young woman nineteen years of age, was admitted to the clinic five years ago because she had definite Hutchinson teeth, and was thin, underdeveloped and anemic. The Wassermann was Kolmer positive. The patient had not had any previous treatment. Her progress in school was not good though she was not subnormal. The treatment was instituted as follows:

- Course 1.—6 neoarsphenamine (.3 gm.), 24 mercury succinimide (.1 gr.)—3 mo. rest.
- Course 2.—6 neoarsphenamine (.4 Gm.), 24 mercury succinimide (.2 gr.)—1 mo. rest.
- Course 3.—6 neoarsphenamine (.4 gm.), 24 mercury succinimide (.2 gr.)—1 mo. rest.
- Course 4.—6 neoarsphenamine, 15 bismuth potassium tartrate—2 mo. rest.
- Course 5.—9 neoarsphenamine, 24 mercury succinimide—2 mo. rest.
- Course 6.—15 bismuth—4 mo. rest.
- Course 7.—6 neoarsphenamine, 15 bismuth.

The Wassermann has remained persistently positive. There is nothing to indicate now as you look at this

—you will admit—very good looking young lady, that she ever had been afflicted. She has developed perfectly through puberty, seems bright and quite normal in every respect.

Case 5.—B. C. is a sister of the patient just observed, is now twenty-one years of age, and was referred by a private physician five years ago. She had been under the care of a doctor three years before for poor vision, but received no anti-syphilitic treatment. She was placed in the sight-saving class at school. At the time she appeared at the clinic she was markedly undernourished and underdeveloped. Her vision was 20/200 in both eyes due to interstitial keratitis of a chronic type. The Wassermann reaction was Kolmer negative on admission, became positive after the second course of treatment and has been negative repeatedly since. Treatment was started immediately as follows:

- Course 1.—6 neoarsphenamine and 24 mercury succinimide (.2 gr.)—1½ mo. rest.
- Course 2.—15 bismuth—1 mo. rest.
- Course 3.—9 neoarsphenamine and 24 mercury succinimide—2 mo. rest.
- Course 4.—6 neoarsphenamine and 15 bismuth—2 mo. rest.
- Course 5.—15 bismuth—3 mo. rest.
- Course 6.—9 neoarsphenamine and 24 mercury succinimide—2 mo. rest.
- Course 7.—15 bismuth—3 mo. rest.
- Course 8.—15 bismuth—2 mo. rest.
- Course 9.—15 bismuth and 15 neoarsphenamine.

The patient consented to come tonight and again you see no evidence of any previous trouble. She is well developed, very well nourished and her sight is uniformly good, according to the eye specialist's report. She has married and with her now is her perfectly normal baby.

Case 6.—The next two cases are brothers. The first, twelve and one-half years old, came to the clinic at five and one-half years of age, poorly developed, undernourished, and very backward (was reported as feeble-minded at the time). The lens in one eye was loose. The Wassermann reaction was Kolmer negative and has remained so since. His treatment has consisted of four courses of twelve neoarsphenamine and fifteen bismuth injections. Rest periods much longer than usual were given in this case.

His physical condition is excellent as you see; but he is still very retarded mentally.

Case 7.—This is a younger brother of the preceding case, now ten years of age, who was admitted to the clinic six years ago, very small for his age, thin, scrawny, and anemic. His Wassermann reaction was Kolmer negative and has remained so. The child was retarded mentally and had begun to walk and talk very late. He was placed on rather intensive treatment as follows:

- Course 1.—6 neoarsphenamine—2 mo. rest.
- Course 2.—9 neoarsphenamine and 34 mercury succinimide—18 mo. rest.
- Course 3.—9 neoarsphenamine and 34 mercury succinimide—5 mo. rest.

Course 4.—6 neoarsphenamine and 24 mercury succinimide—6 mo. rest.

Course 5.—9 bismuth—5 mo. rest.

Course 6.—12 neoarsphenamines and 9 mercury succinimide—6 mo. rest.

Course 7.—12 neoarsphenamines and 15 bismuth.

This boy has developed quite well but not nearly as well as his older brother; yet he is much ahead of him mentally for he is considered very bright in school.

Case 8.—H. M. is a boy, aged 11, admitted to the clinic four years ago with a history of being backward in school. The parents were syphilitic; but the child's Wassermann was Kolmer negative and has never been positive. No previous treatment had been given and the child was markedly underweight and underdeveloped.

The first course of treatment consisted of twenty-four mercury succinimide and six neoarsphenamine injections. Since that he has received four courses, six neosalvarsan and 15 bismuth in each. At present he is getting along very well in school, and is in very good physical condition.

Case 9.—A. M. is the sister of the above case and is ten years old and had been under treatment two years. At the time of her admission she had Hutchinson teeth, was underdeveloped and undernourished, and anemic. The Wassermann reaction was Kolmer negative repeatedly. Her treatment has consisted of four courses of six neoarsphenamine and 12 to 15 bismuth injections each.

Her present state is very much improved physically. Note her teeth, which are in good condition though the Hutchinson characteristics still remain.

Case 10.—H. F. is a boy aged 9, who has a very interesting history. He was seen by a doctor eleven months after birth. At that time he had an enlarged head, rhagades, snuffles, badly decayed teeth, markedly enlarged liver and spleen, discharging ears, and scars on the buttocks. The Wassermann reaction was Kolmer positive. The baby had been given some mercury rubs by some doctor before this (amount not known). Treatment at that time consisted of eleven injections of HgCl_2 (3 mg.) and mercury rubs at home. He was also given two small neoarsphenamine injections (.1 and .15).

This patient was not seen again until he was seven years old, at which time he had a paralysis of the entire right side of the body, the right eye being turned inward markedly. The Wassermann taken at that time was positive. He was given protiodide of mercury for a while without any change and was apparently lost track of.

He was brought to the clinic a short while ago when it was noted that he limped markedly on walking and was unable to hold a lead pencil in his hand. The eye was still turned in somewhat. Since then he has received nine injections of neoarsphenamine and eight mercury succinimide. The child's arm has improved and he is able to hold objects without any trouble. As evidence let this little fellow grip your hand.

Case 11.—R. L. is a boy about five and a half years old, who was brought to the clinic when four months

old with snuffles, fissures, rickets and a weak, wailing cry. He was undernourished and very apathetic. The Wassermann was Kolmer positive. His treatment was as follows:

Course 1.—20 mercury succinimide (.05 gm.), 6 neoarsphenamine (.1 Gm.)—1 mo. rest.

Course 2.—12 sulpharsphenamine (.2 gm.)—2 mo. rest.

Course 3.—9 sulpharsphenamine and 20 mercury succinimide—5 mo. rest.

Course 4.—20 bismuth—3 mo. rest.

Course 5.—15 bismuth—3 mo. rest.

There was marked improvement in his condition; he talked and walked normally. He has not received any treatment for a year because of his exceptionally good physical and mental condition and the repeatedly negative Wassermann.

Case 12.—F. B. is a very interesting case because it represents one of those unfortunate cases of late congenital syphilis. This young man, now eighteen years old, came under the clinic's care three years ago, at which time he was bedridden and in terrible shape. He was actually an emaciated, haggard dwarf, with a perforated palate and septum and extensive necrosis of the nasal bones. Instead of talking he had to whisper. His mental retardation was marked. Just when the stigmata first appeared is not known exactly; but we have snapshots of the patient as a baby and at about thirteen years of age (pictures passed around). In both he appears perfectly normal; and at thirteen years he was apparently a larger fellow than he is now.

The Wassermann reaction was Kolmer positive, became negative after the fourth course of treatment and has remained so. His treatment was as follows:

Course 1.—24 mercury succinimide and 12 neoarsphenamine—1½ mo. rest.

Course 2.—15 bismuth K. tartrate and 9 neoarsphenamine—2 mo. rest.

Course 3.—15 bismuth K. tartrate and neoarsphenamine—1½ mo. rest.

Course 4.—15 bismuth tartrate and 6 neoarsphenamine—4 mo. rest.

Course 5.—12 neoarsphenamine. Put on rest with potassium iodide.

Before the first course was completed the patient was able to get out of bed and was brought to the hospital for operation on his nose. As treatment was continued he began to get about on crutches, gained weight and was able to talk at least, though with a gruff, cracked voice. For the past year he has been able to run around, and has taken over the burden of supporting the family by starting a chicken farm. We feel particularly proud of this case because it represents the return of an invalid, a public charge, to a useful, responsible place in society. Unfortunately, this fellow is going to carry these stigmata through life; and a Wassermann in childhood would have saved this.

CONCLUSIONS

1. Congenital syphilis is more prevalent than is generally believed and is a definite medical problem.

2. The prognosis is generally good, as evidenced by leading authorities throughout the country.

3. The best treatment is prophylactic—which means routine Wassermann tests on all pregnant women and immediate, adequate treatment if positive, regardless of the stage of gestation.

4. Good histories, maternal Wassermanns and also blood tests of the infant in questionable cases will go a long way in the battle against congenital syphilis by assuring an early diagnosis. Do not rely upon the absence of stigmata in ruling it out.

5. Intensive, persistent, modern treatment bordering on adult doses (unless condition contraindicated this) and careful observation through puberty should be the by-word in congenital syphilis. This should include the arseno-

benzols, and either bismuth or mercury, or both, in adequate doses.

6. The comparative study reveals a uniform similarity between the larger clinics and the one here, in admittance signs and symptoms and treatment. The results differ somewhat.

7. The cases presented give you a practical demonstration of what can be done with congenital syphilis.

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A PLEA FOR THE RADICAL TREATMENT OF INCOMPLETE ABORTION*

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PRESENT day medical literature devotes much space to the subject of abortion, its etiology and classification, but more particularly and with more emphasis to the question of its treatment.

There is very little, if any, notable difference of opinion concerning the treatment of threatened and inevitable abortions, but one might venture the statement, without much fear of contradiction, that there are two very distinct schools of opinion when the question of treatment of the incomplete type of abortion is under discussion. These might be called the conservative and the radical schools.

Neither method seems to be followed to the absolute exclusion of the other but most authors follow conservative methods for longer or shorter periods of time and then, when confronted by defeat, adopt the more radical treatment.

During the last five years I have had an excellent opportunity in my service at the Ancker Hospital to see an unusually large number of abortion cases of the incomplete type. At first and early in this work I adopted the curette as my method of treatment with a feeling of fear rather than with a desire to be conservative. I was soon impressed, however, with the remarkable cessation of uterine bleeding and cramps and the rapid convalescence which an instrumental curettage afforded my patients.

These excellent results prompted me to adopt this as the routine method of treatment, safeguarded by a few restrictions, and it is my purpose in presenting this thesis to give a clinical and statistical review of 235 cases of incomplete abortion which I personally curetted, and to note if the facts as revealed by such a survey harmonize in any degree with the mental impression that was gained while the work was being done; also to give my reasons for adopting the radical treatment.

The technic which I adopted was as follows: As soon as practical after admittance to the hospital, the patient is prepared locally and all blood clots and masses passed from the vagina are kept for inspection.

When the patient is under the anesthetic ready for the operation a second bimanual examination is made and she is given a hypodermic of 1 c.c. of pituitrin. The vagina is cleansed with alcohol, the cervix is steadied with a tenaculum and brought forward, care being taken not to make too much traction, and the os is dilated with a Goodell dilator if need be. Gentleness is exercised in inserting the curette into the uterus to avoid the possibility of perforating the organ. The tenaculum is always held by the operator; never by the assistant.

When the uterus is emptied of the remnants of the products of conception its interior is dried by inserting a packing of plain gauze. This is removed and another strip, soaked in 3 per cent iodine, is inserted. This is removed after a moment and a third strip is inserted. This last packing is removed after 24 hours and the patient is given a dram of the fluid extract of ergot, which medication is repeated after six hours.

The purpose of allowing a packing to remain *in situ* for 24 hours is to stimulate the uterus to contract, protect the patient against any possible bleeding and to facilitate the separation of any small remnants which might have been overlooked. The value of this may be over-estimated.

This method of treatment very likely would be endorsed by some authors; regarded perhaps as unnecessarily radical and hasty by others; and most severely criticised by a third group.

Gordon states that curettage often changes an aseptic case to a septic one and is seldom indicated and often harmful.

Child believes that the curette has no place in the treatment of abortion and condemns it severely, while Tovey thinks that the uterus

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should never be curetted. Yates thinks that the curette has killed more persons than it has saved.

Gordon resorts frequently to light vaginal packing which he is obliged to repeat in 20 per cent of his cases and is often obliged to do it a third time. He thinks that curettage may be indicated after a second or third packing. He treats conservatively until it fails and he admits failure in 4 per cent of his cases.

Healey criticises this conservatism, regards packing as not being without its danger, and that it often fails to loosen the product of conception and he favors a curettage as he thinks that there are fewer later complications. Aranow favors a curettage.

Hillis, even in the presence of a temperature, does not pack but empties the uterus with the least possible trauma and thinks that in his series of 1,000 cases curettage did not lengthen the febrile period. He thinks that expectant treatment in non-septic cases is doomed to failure in 40 per cent of cases.

The most frequent objections voiced against the radical treatment of incomplete abortion are the danger of perforation of the uterus; failure to remove all the remnants of the products of conception; damage to the uterine wall; and the fear of infection. On the other hand, many advocate the use of the index finger as the safer method. Magid uses the finger as soon as the os is open and Yates favors this method. Gellhorn thinks a sharp curette is far less violent than a blunt one and lodges the same criticism against the digital curettage.

Let us consider digital curettage first. Many cases of incomplete abortion that are sufficiently sick to be admitted to a hospital have rather large subinvolved uteri with deep cavities, and at times the decidual remnants are still firmly attached. In order that the index finger may explore the whole of the uterine cavity and reach as high as the fundus, it is necessary that the operator insert his whole hand in the vagina and make firm pressure on the uterus in order to telescope it over the exploring finger. The finger must be of more than average length and one encounters the added difficulty of having the os plugged by the larger proximal end of the finger.

This is a dangerous procedure. When one recalls Sampson's work on the etiology of endometrosis and the possibility of the escape of the

menstrual blood from the fimbriated ends of the tubes under the pressure of rather mild uterine contractions, it is easy to comprehend how it is very possible and highly probable while doing a digital curettage to force some of the uterine blood, mucus and other debris through the tubes and into the abdominal cavity. Furthermore, and as will be shown later in this discussion, this uterine material is often infected although the patient's temperature and the local condition might not suggest it.

Regarding the possibility and danger of a uterine perforation, it is a valuable safeguard to make a second bimanual examination while the patient is under the anesthetic and the administration of 1 c.c. of pituitrin at this time aids the uterus in its involution. While I encountered many retro-uteri with displacement of varying degrees, and many organs with deep cavities and soft doughy walls, it was not my harrowing experience to perforate a single uterus in this series of 235 cases.

It is true that if one were to subject the interior of the uterus to a microscopical examination after an instrumental curettage, no doubt many decidual and chorionic remnants could be found. This is theoretical and not practical. In this series of cases it was my embarrassment on only one occasion to be obliged to curette a patient the second time.

If one may regard the pathologist's reports as any criterion of the subject, one is impressed with the fact that the presence of uterine muscle in any abundance in the curettings is very infrequent; he reports it only once.

While on this subject perhaps I may be permitted to state that in not a single instance did the pathologist's report make mention of the presence of a fetus in the curettings.

The danger of infecting a patient through curetting is not great if one is careful of his technique and gives proper consideration to self-induced abortions and the presence of fever. Gordon regards his patient as septic if she has a rectal temperature above 101 or if the abortion was induced or if there have been subsequent intra-uterine manipulations. Gellhorn regards the treatment of criminal abortion as synonymous with sepsis and regards all septic abortions as criminal and thinks that 90 per cent of them should be so classed.

The point is often emphasized that while a

uterus can withstand the trauma and possible introduction of infection occasioned by a first dilatation of the internal os, it cannot withstand a second such dilatation. This may be true. But I take the stand that when a uterus is subinvolved and bleeding and harboring foreign material in the form of remnants of the products of conception, which themselves are often undergoing degenerative changes, it is more beneficial to the patient and very safe indeed to dilate the internal os amidst the surroundings of a present day operating room and stimulate and assist this important pelvic organ to return to normal. Furthermore, in many of these cases the internal os is wide open, allowing infection free entrance to the interior of the uterus and it will continue to do so until the uterus is empty.

So, none of the objections so frequently raised against an instrumental curettage of the uterus in incomplete abortion is serious and cannot be avoided. On the other hand, there are some very excellent reasons why such a procedure is very appropriate and holds out many advantages to the patient. In the first place it shortens the patient's stay in the hospital. This shortened hospitalization and reduced expense occasioned thereby are important matters to the average patient and in this series of cases, all of whom were in a municipal institution, it lightens the load of the taxpayers.

These 235 cases spent 1,247 preoperative days in the hospital or an average of 5.3 days each. Sixty-eight patients, or 29 per cent, were in the hospital longer than this average period while 167, or 71 per cent, were in the hospital five days or less, but the largest number only three days. The only conservatism that I displayed here was occasioned by the desire to make a correct diagnosis before resorting to operation and to allow a temperature to return to normal for a safe period of time.

When the uterus is finally emptied of its contents three very apparent and important things take place. The depth of the uterine cavity, as measured by the distance that the curette enters, lessens perceptibly due to the contraction of the organ occasioned by stimulation of the manipulation and the oxytocic action of the pituitrin. The second change noted is that the uterine wall becomes thicker and firmer, and thirdly, there is decidedly less bleeding.

At this point it may prove of much interest to

make an analysis of the pathologist's findings in the curettings sent to the laboratory. Immediately his findings permit division in two groups, non-inflammatory and the inflammatory. The former group contains villi, decidua and hypertrophic endometrium, either alone or in combination; the latter group contains inflammatory cells and exudate, degenerated and infected blood clots, white blood cell infiltration in combination with villi, decidua and hypertrophic endometrium. Out of 192 reports from the laboratory which are on record in this series, ninety-five would come in the non-inflammatory group, while ninety-seven would be classed in the inflammatory group.

With these facts arrayed before us, it becomes very difficult to regard any so-called conservative treatment which permits this material to remain in the uterus as being safe and sane. To allow this debris to remain in situ must invite an endometritis, prolong subinvolution and endanger the patient to a pelvic infection and invalidism. On the other hand, to remove this material removes a focus of infection; to allow the uterus to involute properly protects the patient against endometritis, myometritis, dysmenorrhea, menorrhagia and metrorrhagia, etc.; to control the uterine bleeding conserves the patient's energy and strength and enhances her chances for victory in her battle for restoration of health.

Furthermore, one must not overlook the fact that a hydatid mole with all its possibility of malignancy can arise from the chorionic villi of an incomplete abortion.

The post-operative results were very satisfactory. In the early part of this work I endeavored to keep all the patients in the hospital for a full week after curettage. But I became more liberal in this respect when some patients left the hospital earlier without any apparent bad results. The 235 patients in this series spent 1,625 post-operative days in the hospital, or an average of seven days each. Eighty-one per cent came in this group, while 19 per cent stayed longer than seven days, but the largest number only five days.

The American College of Surgeons, in defining post-partum morbidity, defines it as a condition of elevation of temperature to 100.4 during any two consecutive days post-partum, with the exception of the first day. While the post-operative state of these patients cannot rightly be regarded as post-partum, they have, nevertheless,

much in common. According to this definition I had thirteen cases of morbidity, or 5.5 per cent.

A further study of these cases is interesting. According to this definition they all exhibited a preoperative morbidity although the temperature may not have been as high or lasted as long as it did postoperatively. The average preoperative days of hospitalization in the morbidity cases was 8.75 days, while the post-operative hospitalization was 15 days, which figures are both much higher than the average for the whole series. The average number of days preoperative in which the morbidity patients were afebrile was 2.25 days; the longest was five days. Hillis emphasizes the value and importance of at least a 5-day afebrile period before operation and states that there is less postoperative fever if this is adhered to. Tuttle experienced that febrile cases operated on promptly had a higher average of postoperative febrile days.

One patient was in the hospital for seven weeks before operation with only four afebrile days and 25 days after operation with 17 afebrile days. Her convalescence was interrupted by an ice bag burn. Another patient had 3 afebrile days before operation and developed a pelvic abscess which was drained vaginally 17 days after curettage, following which she improved rapidly. These two cases exhibited the outstanding morbidity, 0.8 per cent.

I made several mistakes. While all of these curettages were done because of a diagnosis of incomplete abortion, the pathologist's report failed to substantiate that diagnosis in several cases. He reported chronic endometritis in one case; acute endometritis in two cases; normal endometrium in three cases; uterine muscle fibres in one case and necrotic mass in two cases. This last may have been the result of an incomplete abortion. I anesthetized one patient for operation who had a pedunculated submucous fibroid. One patient, as stated earlier in the paper, had to submit to a second curettage. There were no deaths in this series of 235 cases.

I regret that I did not follow the routine practice of making a pelvic examination before discharging the patient. The findings would have lent themselves admirably to a fuller discussion of this subject. Questionnaires were mailed but only fifty-six replies were received. Two sets of questions were asked. The first set dealt with the possible development of pelvic trouble as a

result of the curettage while the second had to do with the patient's future pregnancy, if any.

Comparing and analyzing the answers of those whose reply suggested a possible pelvic pathology, I am not convinced that any of them suffered any bad results. Seven patients reported some bleeding after leaving the hospital; two no doubt had reference to menstrual periods while five of these reported a subsequent pregnancy, four of them miscarrying. Eleven of the patients thought that they had developed a leukorrhea, seven of these reporting a subsequent pregnancy, four going to full term. Five reported changes in their menses, three miscarrying when they became pregnant. Three reported pelvic trouble, of which one went to full term in her subsequent pregnancy and a bimanual examination showed a negative pelvis. Another one was in need of a pelvic repair which she has had done since then.

In the second set of questions, which dealt with a possible subsequent pregnancy, I find that 50 per cent of the replies received showed a pregnancy after the curettage, of which 63 per cent either went to full term or were pregnant when they answered the questionnaire.

This analysis, although not based on a large series, convinces me that a carefully safeguarded curettage for incomplete abortion does not lend itself as an etiologic factor in the production of pelvic pathology or sterility.

Conclusions.—Curettage of the uterus for incomplete abortion with a sharp curette, as was done in this series of cases, is a safe and justifiable procedure.

Certainty of diagnosis, a definite afebrile preoperative period of about five days and care in technic are very important.

To empty the uterus of its foreign and infected material, stimulating it to contract and controlling the bleeding, safeguards the patient, shortens her stay in the hospital, conserves her energy and enhances her chances of recovery.

Perforation of the uterus can be avoided and the danger of incompletely emptying the uterus is overestimated.

Digital curettage is an unsatisfactory and dangerous substitute operation.

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PROPAGANDA FOR REFORM

Ampoule No. 61 Sodium Salicylate 15 1/2 Grains, Ampoule No. 66X Sodium Salicylate, Sodium Iodide 15 1/2 Grains Each, Ampoule No. 66X Sodium Salicylate, Sodium Iodide and Colchicine, and Ampoule No. 50 Iron and Arsenic (Iron Cacodylate) 1 Grain, Not Acceptable for N.N.R.—The Council on Pharmacy and Chemistry reports that these are included in the list of ampoules for intravenous use marketed by the Lakeside Laboratories, Inc., Milwaukee. In 1921, in reporting on "Some of Loeser's Intravenous Solutions," the Council stated the objections to the intravenous administration of sodium salicylate and sodium iodide and of mixtures of drugs in fixed proportions. Since this time no evidence in favor of the routine intravenous administration of sodium salicylate or of sodium iodide has been brought forward, and the objections to the fixed proportion mixtures applies to the mixtures listed in this report. Ampoule No. 50 Iron and Arsenic (Iron Cacodylate) is unacceptable because the name is nondescriptive; because recommendations for the routine intravenous use of iron are not warranted, and because iron cacodylate presents an irrational and useless method of the administration of iron and arsenic. The Council declared Ampoule No. 61 Sodium Salicylate 15 1/2 grains, Ampoule No. 59 Sodium Iodide 15 1/2 grains, Ampoule No. 66X Sodium Salicylate, Sodium Iodide 15 1/2 grains each, Ampoule No. 66 Sodium Salicylate, Sodium Iodide and Colchicine, and Ampoule No. 50 Iron and Arsenic (Iron Cacodylate) 1 grain unacceptable for New and Non-official Remedies because recommendations for the routine intravenous administration of sodium salicylate and sodium iodide are not warranted and because the administration of sodium salicylate and sodium iodide, of sodium salicylate, sodium iodide and colchicine in fixed proportion and of iron and arsenic in the form of ferric cacodylate whether intravenously or otherwise is irrational. (*Jour. A. M. A.*, January 4, 1930, p. 31.)

Excretion of Barbitol.—Sir Maurice Craig holds that barbitol preparations may be taken for years without producing deleterious effects. This view has received some experimental verification. On the other hand it has been held that in certain conditions—Manic-depressive insanity, constitutional psychopathic inferiority and psychoneuroses—its use may lead to habit formation and that to such patients these drugs should never

be administered. (*Jour. A. M. A.*, January 4, 1930, p. 35.)

Pituitary-Solution-Squibb 1 c.c., 5 Units, and Pituitary Solution-Squibb 1 c.c., 20 Units, Not Acceptable for N.N.R.—E. R. Squibb & Sons market Pituitary Solution-Squibb 1 c.c., 5 units, and Pituitary Solution-Squibb 1 c.c., 20 units. The first product is one-half the strength of solution of pituitary-U.S.P., while the second is twice the strength. The Council holds that it is not in the interest of rational therapy to market strengths different from that of the standard pharmacopeial product and therefore cannot give recognition to such preparations. Accordingly, the Council declared these Squibb preparations unacceptable for New and Non-official Remedies. (*Jour. A. M. A.*, January 11, 1930, p. 105.)

Resuscitations and Intracardiac Injections.—The power to revive the dead is one that the physician is often, but vainly, expected to exhibit. The alleged miracles of such revivals by injecting epinephrine into the heart are always widely reported in the newspapers. Physicians who have heard of these alleged resuscitations are tempted to employ the same means. If the death was real, no harm and no benefit results. Revival follows sometimes, perhaps not because of the treatment but in spite of it. In such cases there is indeed grave danger that serious injury may follow from the treatment that the patient has received. The evidence seems conclusive that, if the patient revives after such an intracardiac injection, he would have revived without it. Intracardiac injection is not a justifiable measure for resuscitation. (*Jour. A. M. A.*, January 11, 1930, p. 107.)

Cod Liver Oil Viosterol or Sunlight for Rickets.—Cod liver oil, viosterol and ultraviolet rays are generally accepted as specific agents in the prevention and cure of active rickets in infants. Their relative merits are still under investigation. Cod liver oil contains the valuable vitamin A in addition to vitamin D. Viosterol is of advantage because of the ease of administration and its concentration. Ultraviolet rays are undoubtedly a valuable therapeutic agent when under controlled supervision. Their effect on general nutrition and resistance as well as on the calcium retention is good. Their use to the exclusion of vitamin D or viosterol seems unwise. A combination seems most desirable when sunshine is not available. (*Jour. A. M. A.*, January 25, 1930, p. 283.)

CORBUS' DISEASE REPORT OF TWO CASES

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and

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EROSIVE or gangrenous balanitis was first described by Bataille and Berdal in 1889. Their work was confirmed by Scherber and Muller in 1904. The disease, however, was not recognized as an entity until Corbus and Harris, working in the United States, established it on a clinical and pathological basis as a fourth venereal disease. In 1909 they defined it as "a specific infectious venereal disease, caused by a symbiosis of a vibrio and a spirochete, with local and constitutional symptoms varying with the severity of the infection."

The disease is practically limited to those of unclean habits. Predisposing causes are: (1) long, tight foreskin which excludes the air; (2) moistening the genitalia with saliva. As the organism is anaërobic, it can only occur in those who have not been circumcised. In most cases a history of unnatural sexual relations, or of moistening the genitalia with saliva may be obtained.

The specific organisms of this disease are a vibrio and a spirochete. Microscopically and morphologically they are identical with Vincent's organisms. Whether they are the same organism is still a debated point. They grow under anaerobic conditions on serum agar and stain with ordinary dyes. The vibrio is gram-positive and the spirochete gram-negative.

The pathology begins with an erosion usually in the sulcus coronarius. It spreads rapidly to the foreskin and glans, ulceration becomes widespread and gangrene of a large part or the whole of the penis occurs if not treated promptly.

These greyish and hollow ulcers may be single or multiple. There is itching and burning under the foreskin, but no pain on micturition. The foreskin may be retracted without difficulty and constitutional symptoms are absent.

As the condition progresses the ulcers deepen and become irregular in outline. They tend to become confluent, forming ulcers from one to one and a half centimeters in diameter. The bases are irregular and covered with a necrotic yel-

lowish white or brown pseudo-membrane. The edges are clean cut and slightly raised. The foreskin is edematous and cannot be retracted. There is a thin, yellowish white foul discharge in which the specific organisms can always be found.

Venous stasis and thrombosis supervenes, due to the edema. The overlying skin becomes dark and finally black and necrotic. If not treated energetically the entire penis becomes involved in this process. The entire penis becomes enormously edematous, the dorsal lymph cord is palpable and the inguinal glands are enlarged. As a rule, however, they are not painful.

Constitutional symptoms at this stage are very often severe. Vomiting, headache, general malaise, chills and fever with a temperature of 100-101 are common.

If untreated the whole penis and scrotum becomes a black, sloughing mass. The patient gradually dies from toxemia.

Differential diagnosis is important so as to institute the proper treatment early. Chancroid may resemble it closely but does not spread with the same rapidity. Microscopic examination of the smears moreover show Ducrey's bacillus. Painful suppurating glands are common in chancroid, whereas in gangrenous balanitis the enlarged inguinal glands are painless and do not suppurate.

The hard chancre of syphilis comes on later and is more indurated. The type of spirochete may also be differentiated by dark field examination.

The treatment in the early stages is frequent cleansing and exposure to the air. When there is edema of any extent present, the preputial sac should be irrigated every half hour with some mild oxidizing agent such as hydrogen peroxide 2 per cent, or potassium permanganate 1/4000, until the condition subsides. This is done most conveniently with a Guyon catheter attached to an all-glass syringe. Cold applications of Dakin's solution in the intervals are excellent.

If the foreskin is gangrenous, enough should be removed to expose the ulcers freely. Some advise using the cautery for this purpose. A continuous irrigation, similar to the Murphy drip method, is commenced, the tube being fixed in a light dressing over the penis. Within forty-eight hours there is a marked improvement, both local and general. Any further necrotic areas slough away and the patient is left wholly or partially circumcised.

The following two cases are reported for the purpose of showing, in the first case, the usual course of the disease, and, in the second, some unusual and interesting features.

Case 1.—F. H., aged 28, was admitted July 2, 1928, to the observation ward at the Winnipeg General Hospital with pain, swelling and edema of the foreskin. The skin over the dorsum of the glans was quite black. His temperature was 100, but his general condition good.

Six days previous to admission his symptoms began with itching and burning under the foreskin. His symptoms gradually became worse until, after five days, the skin over the dorsal surface of the glans penis became black.

On admission the entire penis was edematous, the foreskin over the dorsum of the glans black and gangrenous with a thin and extremely offensive pus exuding from beneath it. The foreskin could not be retracted. A smear of the discharge showed spirochetes and fusiform bacilli.

He was put on alternate irrigations of hydrogen peroxide and 1/4000 potassium permanganate every half hour, cold compresses being applied continuously in the intervals.

By July 3, the gangrenous portion of the foreskin had sloughed entirely, exposing several large ulcers on the glans and sulcus.

In spite of a negative Wassermann, the patient was given .45 novarsenobenzol intravenously, and some of the novarsenobenzol powder was dusted on the ulcers directly. A continuous drip of 1/4000 permanganate was started. Temperature 100.6, general condition good.

On July 4, the ulcers appeared much cleaner. Temperature 99. Smears from the mouth reported positive for Vincent's organisms. The patient admitted moistening the penis with saliva.

The following day the temperature was normal, the ulcers were healing well and the general condition was good.

July 13. Temperature still remained normal. The ulcers were practically healed. The potassium permanganate drip was discontinued and the patient was allowed up.

By July 16 only very small ulcers covered with dry crusts remained. The patient has lost only that portion of the foreskin which was gangrenous on admission. He was discharged in good condition.

Case 2.—F. Z., aged 46, was admitted to St. Joseph's hospital Feb. 11, 1928, with a temperature of 102, pulse 128 and respiration 32.

The patient stated that ten days previous he froze his penis while working in the bush. The first thing he complained of following this was a soreness under the foreskin. He held a consultation with a fellow workman, who advised painting it with iodine. This treatment was carried out. The following morning the penis was very sore and very swollen at the end. This was one week ago and the swelling has progressed.

The penis was swollen up to the base to a diameter of 1.5-2 inches and was about six inches long. The skin was thick, edematous, firm and did not pit readily on pressure. A cough was present and the breath offensive.

I first saw the patient on February 13, twelve days after the onset of the infection. At that time the penis was tremendously swollen and the swelling and edema had extended over the entire front half of the scrotum. There was a slight seropurulent discharge from the under surface of the foreskin, but the edema was so great that the glans could not be seen. There was a small area on the dorsum of the foreskin which was dark in color. The man's general condition was very poor. His respiration could be heard over the entire ward and he was cyanosed. Percussion yielded no dullness but both lungs were full of coarse râles from apex to base. The heart was not enlarged but the heart sounds were of poor quality. The patient's temperature was 100, and his pulse ranged from 120 to 140.

It was felt that a dorsal slit offered probably the best chance of saving the penis, and this together with two incisions into the scrotum was made under sacral anesthesia at once.

In the first twenty-four hours following the incising, the actual nature of the disease was not recognized. Smears taken and planted in an anaërobic medium yielded a mixed growth of bacteria. The wound was fomented and the patient was put on brandy and digitalis. The afternoon of the operation the patient had a smart hemorrhage which was arrested without difficulty.

After forty-eight hours the condition was recognized as probably a very severe form of Corbus' disease. It was thought that the lung condition was an entirely different process arising from exposure and cold. Dakin's compresses and irrigations were commenced and fluids pushed to 3,000 c.c. daily.

Within seventy-two hours from the time of incision, the entire skin covering the penis and anterior surface of scrotum became black and gangrenous. At the end of the fifth day the whole mass sloughed away leaving the shaft of the penis completely uncovered and the testicles exposed.

The shaft of the penis was found to be necrotic also. It was evident that the penis was going to slough probably as far as the triangular ligament. The patient's general condition was extremely bad. The temperature varied from 97 to 103, pulse 100-140 and respiration 30 to 50 per minute. The patient was delirious at

least half the time. Examination of the chest revealed the lungs full of râles and some increase in heart dullness. The patient's condition was such as to prohibit any thorough examination.

On February 21st the penis dropped off level with what was apparently the triangular ligament (Fig. 1).



Fig. 1.

The Dakin's compresses were continued alternating with carbonlight and the wound gradually became quite clean and a mass of granulations.

The patient's temperature gradually subsided, his pulse came down to about 110 and his general appearance improved. On March 1, 1928, he complained of

a sore thumb. It was tender on pressure and was dull red over an area the size of an American nickel. The spot was black by the next day and was incised and Dakin's compresses applied. The patient's condition remained unchanged until ten P. M. March 4th, when he suddenly died.

POST MORTEM FINDINGS (DR. O. C. TRAINER)

There has been a gangrenous process of the penis and scrotum which has resulted in a complete sloughing of the penis level with the triangular ligament and partial sloughing of the scrotum involving chiefly the anterior wall.

On removing the anterior chest wall a large abscess is seen to occupy the antero-superior part of the mediastinum, involving the pericardium and encroaching on the medial aspect of the right lung. This part of the lung is necrotic and partially sloughed away. The abscess is filled with a foul smelling necrotic mass.

Smears from the mediastinal abscess and from the genitalia show large numbers of a fusiform bacillus and a spirillum resembling Vincent's organism. Cultures showed mixed growth of staphylococcus aureus and streptococci.

These two cases are reported for the purpose of putting on record the latter case, in which apparently the original lesion in the genitalia gave rise to secondary infection of the lungs and mediastinum.

Although we were unable to grow the Vincent's organisms in the one culture planted, we feel that this is a true case of Corbus' disease.

VAGINAL STERILIZATION

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A LARGE variety of pathogens have been found in the genital tract following delivery: *streptococci pyogenes* and *hemolyticus*, *staphylococcus pyogenes*, *bacillus coli communis*, gonococcus, pneumococcus, *B. diphtheriae*, *B. typhosus*, *B. tetanus*, *B. erogenos capsulatus*, *B. pyocyaneus*, *micrococcus tetragenus*, *staphylococcus parvulus* and other putrefactive organisms as *B. funduliformis*, *B. radiiformis*, *B. proteus*, and anaërobic streptococci which have been held responsible for fever and death.

The question as to how these organisms enter the birth canal is important since with this knowledge it may be possible to prevent such entry. Many investigations have been made to determine the bacterial content of the vagina and uterus and show that these organs are, with few exceptions, free from pathogens. The uterus, cervix and upper portion of the vagina normally have no pathogenic content.

It has been demonstrated that the introduction into the vagina of any object, sterile or contaminated, will carry with it bacteria. This may be accomplished by the physician, nurse, midwife, or patient through vaginal examinations, douche nozzles or instruments. How much time is required for the vagina to resume its normal state, free from organisms, after contamination seems an unsettled subject. It probably depends on the number of organisms introduced, the virulence of the bacteria, the condition of the patient, and the condition of the generative tract, whether infected or filled with vegetative matter. Some authors recommend that the patient refrain from coitus during the last few days prior to labor: others, a period of six weeks. This must indicate that in the experience of these advisors, the introduction of contamination requires approximately that interval for control.

The present trend of obstetric teaching is to avoid the passage of any object into the field of labor for some period before labor, and presupposes that the lower uterine segment, cervix, and vagina are sterile when the patient enters the hospital. Still applying the same reasoning, all effort is made to see that the labor is attended

by no vaginal examinations, and as little instrumentation as is compatible with the life and health of the mother and child, during that particular labor. If, then, infection occurs, it is stated that outside influence was responsible for the introduction of bacteria. If death from infection occurs, the statement is made that the attendant is responsible for the death. This, in spite of the fact that since the time of Holmes and Semmelweis, a concentrated effort has been made to avoid introducing anything into the obstetric field.

In Lea's masterly review¹ of puerperal infection is given an extensive account of the deaths from this cause in England and Wales and a slightly lesser study of these deaths in various parts of Europe. In this country, a somewhat similar exposition has been made by McGlinn² and others. They show that 35 to 48 per cent of all maternal deaths are due to puerperal infection. Various explanations are made as to why infection follows childbirths, and is so severe as to cause many deaths. Even with the large majority of medical men graduating from first rate medical schools and with most of the obstetricians realizing that the entry of the vagina manually or instrumentally means infection, still infections occur. Not only do infections occur in cases subjected to vaginal interference but it also appears in some cases which are in every way delivered ideally. Death from infection is known to result where there has been no vaginal examination, no instrumentation, no accidents of labor and no lacerations.

We tend to blind ourselves by believing that the bacteria have been introduced before the patient came under our attention. But if such a thing has occurred, what does that mean to us? It means simply this,—we are dealing with an *Infected Field*. Every obstetric case that enters our professional care is potentially infected before we see the case on the delivery table. We cannot know beforehand what case will develop fever. The patient may deliver very promptly, with no apparent abnormality and subsequently die of infection. Is this the doctor's fault? Is

it the fault of the attendant when the best technique known is applied to a labor and the patient dies of infection?

Of course there are occasional epidemics of infection, such as occurred in the Sloane Hospital in 1927, which clearly implicate the attendant as an agent in carrying outside infection to the obstetric patient. But this again is a factor for potential infection which must be faced by every hospital in the country. Is there nothing that can be done to counteract the potential infection present in every obstetric case?

There are two sources of bacterial invasion in the parturient patient: (1) Infection present in another part of the patient's body which may spread to the labor wound (through blood, lymph or contiguity); (2) infection present in the birth canal (already present or introduced shortly before labor) which may spread to the labor wound. By careful prenatal attention, every effort is made to bring the mother through the period of gestation with the elimination of infection in any part of her body. Accurate instruction is given her how to avoid the possible presence of infection in the vagina previous to labor; and, finally, labor is so conducted as to minimize the possibility of bacterial invasion during parturition and puerperium. These efforts are not without their results, but an occasional case will slip through this close attention, and an infection result in a fatal outcome; and, to all appearances, this is in spite of the most religious application of our most advanced scientific management.

What is to be done with the potentially infected maternity patient? Every mother is potentially infected.

Every labor presents a wound. The woman's natural recuperative processes, especially in the usual absence of bacteria, result in complete return to normal in a few weeks' time. But if bacteria are present, the mother's resistance may be taxed to the utmost.

The character of the labor has much influence on a potential infection. The presence of toxemia in a mother is a known agent for increasing the possibility of infection. A long labor with need for surgical interference adds a few points to the already high percentage possibility of infection. Lacerations of all sorts in the perineum or cervix, both of which are such common points of stress during labor, open the weakened tissues to direct bacterial action. If the membranes rup-

ture early, or there is a placenta previa or, from other causes, blood in the birth canal before labor, there is an increased likelihood of infection. The crushing of soft parts against a deformed pelvis, even without rupture of the uterus, may result in direct extension of infection to the peritoneum.

The type and number of organisms and the point of entry determine the localization and character of the infectious lesion—whether it be abscess, phlegmon or thrombus.

We know that with our best efforts to prevent infection, it will occur in a small percentage of all cases. Of the febrile patients, some will die. After the infection has started it is too late to expect to accomplish much by radical procedures.

The time to deal with puerperal infection is before the labor is accomplished, while we know we are dealing with a potentially infected field.

We would not undertake a surgical operation without first making every effort to destroy the bacteria which might gain entrance into the wound. Yet we deliver a patient, following which we know there will result a large obstetric wound through a field which we know beforehand may contain bacteria, without any effort to destroy the bacteria we suspect to be present. Studies on the aseptic vaginal examination show that after this method of procedure, the number of postpartum infections have doubled. Proof more positive could not be presented that these additional infections have come from bacteria already present in the vagina. Yet no effort is made to destroy these bacteria. We introduce a bag aseptically, dilate manually aseptically, perform instrumentation aseptically, and as a result treble the postpartum infections over what would be present in the normal spontaneous delivery. We can give no more certain evidence of the presence of bacteria in the vagina than these figures. The bag had on it no bacteria; the hand was gloved and sterile; the instrument certainly was not contaminated. What happened to double and treble the infections. Bacteria already present have been carried from the lower portions of the vagina to the higher levels—closer to the obstetric wound.

Yet these maneuvers are performed aseptically—not antiseptically. No effort is made to destroy these bacteria which are without question responsible for the additional infections in these cases.

Why should not a field which is not sterile, and is about to be the site of a formidable injury, with expectation of exposing the body to the ravages of micro-organisms which are known to be present, be rendered as sterile as the present knowledge of antiseptics will permit? Why is it considered unscientific to prepare a patient for an ordeal with the greatest protection we can offer—the destruction of the bacteria which may cost her life?

These questions have appealed to other observers in former times—Zweifel,⁴ Schweitzer, Esch, Schröder, von Herff and others. Effort has been made to sterilize the vagina using douches and antiseptic preparations. Because these efforts failed, and some of them increased the percentage of infections, all attempts were dismissed as useless or even harmful. But a conscientious study of the actions of antiseptics on mucous membranes shows that the requirements of disinfection of mucous membrane are somewhat different from those that apply to the external skin. The antiseptic which sterilizes the skin may injure the mucous membrane, cause it to become swollen, parched, dry, cracked, fissured, and expose it to further invasion of the bacteria which unquestionably will grow again in larger form and numbers when nourished back to life (after the passing of the bactericidal action) by the excellent culture medium of the body fluids seeping through this injured mucosa heated to the optimum temperature of the body. When such a strong antiseptic was applied to the obstetric patient, it is little wonder that the number of infections increased. Another factor which has done much to wave aside any suggested further investigation of this field, by even the most courageous of scientific advocates, has been the very thing which first reduced the morbidity to its present figure—the work of Holmes and Semmelweis. So thoroughly has their thought been impressed upon us, that we cling to the opinion that nothing—not even a suitable antiseptic—must be conveyed into the vagina.

This, however, is contrary to our own honest judgment. If we will consider a little, we must see clearly that an antiseptic non-injurious to the mucosa, non-toxic, bactericidal, introduced into the obstetric field often enough during parturition to destroy or vitiate pathogenic entry into the obstetric wound must reduce to a minimum any possible source of infection through

the birth canal. We cannot prevent the spread of hematogenous, lymphatic or contiguous (ovary, tubes, etc.) infection when it is already present in the patient's body, and the obstetric wound is open, offering such splendid pabulum to circulating organisms.

It remains for us then to consider the subject of the preparation of the obstetric patient for the delivery of the fetus. The manner of preparation is sometimes fruitful of trouble. In some hospitals, one observes that after shaving the perineum, the abdomen, thighs and perineum are carefully washed with soap and water: the excess of cleansing fluid is flushed away by pouring water over the abdomen, thighs and perineum. Finally, this water is poured over the vulva. If one inserts a speculum into the vagina after such a preparation, water will be found in the vault of the vagina. This water has entered through the introitus, carrying with it bacteria from the vestibule, labia minora, majora and clitoris. For this reason, a sponge must be held over the introitus so that no cleansing fluid enters the vagina. The antiseptic is painted on beginning with the labia minora, and is applied laterally, in either direction, until the entire perineum and portions of the abdomen and thighs are well covered. The attention to the anal region is last given and no other part of the skin is touched with that sponge, once the anus is touched. If more antiseptic is desired, a clean sponge is taken.

The labia minora (which have been painted) are carefully separated, and the vestibule is thoroughly saturated with the antiseptic. Finally, a clean sponge soaked with antiseptic is inserted into the vagina just at the aperture. Then with sterile gloved fingers separating the vaginal aperture antiseptic fluid is introduced into the vaginal canal, and the gloved sterile fingers work this well into the mucosa of the entire vagina. This application may be made through a speculum if so desired, as the leaves of the speculum iron out the rugæ of the vaginal walls. If labor continues for any length of time, this preparation must be repeated every eight to twelve hours, depending on the type of antiseptic and the length of its action.

A study of the various types of antiseptics shows that at present the most advantageous drugs for mucosal sterilizing are hexylresorcinol and mercurochrome. Recently a product known

as merthiolate has been advanced with experimental data that place it on a par with those mentioned above. Hexylresorcinol depends for its action upon its physical properties, and will not act unless it comes in contact with the bacterium in sufficiently strong solution to dissolve the germ. Mercurochrome, and apparently merthiolate, depends upon chemical action, and is germicidal in very weak solutions. For this reason I have utilized mercurochrome, though other men, engaged in the same effort, have apparently secured equally good results from hexylresorcinol. No clinical application has as yet been made of merthiolate.

Harry Mayes³ has developed a technic using 4 per cent aqueous solution of mercurochrome and painting this over the perineum and introducing 4 c.c. into the vagina, working this in gently with the gloved fingers.

My own method, started before I was aware of Mayes' work, is to paint over the perineum a 10 per cent solution of mercurochrome, and introduce into the vagina a solution of glycerine (5 c.c.) containing enough mercurochrome to make 5 per cent and iodine 1 per cent.

Other methods have usually made use of iodine solution over the perineum, removing this with sodium thiosulphate or alcohol, or using alcohol alone over the perineum, but these drugs are too irritating to introduce into the vagina.

From the figures presented by Mayes and his co-workers and from my own experience, the morbidity in obstetrics has been reduced one-half or more.

It is to be recognized that the ideal method of antiseptic preparation has not been produced. What we have at present to work with may not be properly applied. Both the technic of appli-

cation and the drug itself will be changed in the future advance of scientific attainment.

Summary.—We have attained the highest excellence in our methods of preparing our rooms, instruments and apparatus. We are most exact in the management of labor, but we fail to remove from the birth canal the pathogenic bacteria which are present in a few cases. After shaving, cleansing and sterilizing the perineum, by introducing into the vagina antiseptic solutions, mild enough to be non-injurious to the mucous membrane, but strong enough to kill or vitiate pathogenic bacteria, by repeating this application often enough to allow no recovery of the bacteria during labor we may leave to the maternal body an easier recovery, with less likelihood of postpartum infections as shown by the consideration given in the above discussion.

Conclusions.—There is need for more investigation along the lines of antiseptics for use on mucous membranes. If an efficient mild antiseptic, non-injurious to the mucosa but bactericidal, is applied to the perineum, vulva, and vaginal mucosa, and repeated at intervals during parturition, infections during the puerperium will be reduced approximately 50 per cent.

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WHEN IS A HYPERPLASTIC SINUS, AND WHAT? AND ITS PARALLEL, THE MUCOID EAR

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THE title of this paper is, I believe, the feeling of the majority of the profession and, too, of the average rhinologist insofar as the application of his knowledge of the condition goes, in ready, definite clinical recognition and correct estimation of so-called hyperplastic, non-suppurative paranasal sinus disease.

Many years, successively, of groundwork and preparation under competent control, of continuous fraternal contact in the specialty, and with average intelligence, maybe, have failed to qualify me to the extent of being able to pronounce a nose "positively negative" after examination by the usual, accepted methods; and I believe that internists generally are beginning to feel that way toward others upon receiving such report from their rhinologist consultant.

A nose that shows little or nothing by clinical inspection, anteriorly and posteriorly, either before or after shrinkage, or after suction, by puncture and irrigation, or definitely enough by transillumination, or even by simple, unaided radiography, but may still hold a diseased sinus which is a depot of poisoning, has long been a constant dread to many of us, largely as a result of Sluder's writing concerning posterior nasal pathology, but never so thoroughly appreciated until the advent of iodized oil in radiography.

The culprit in this blind, blank chapter of rhinology has been the non-suppurative, so-called hyperplastic sinusitis, better named, I think, mucoid sinusitis, at least in part of its course, and, like its parallel condition, mucoid otitis media, a bugaboo, also, in otology.

Neuman, several years ago, in spite of considerable contradiction by his fellow workers in Vienna, established well the separate clinical entity of mucoid middle-ear disease and its altogether different needs, both in recognition and handling, from the serous and suppurative forms. His demonstrations were positive and indisputable in diagnosis and treatment, and I am sure have never been forgotten by any member of his classes.

When this great difference in middle-ear affec-

tions is so manifest by direct visibility and in experience in handling them, surely, then, a parallel condition is to be met in anatomically and physiologically corresponding structures; and it does exist in the nose, but recognition is infinitely more difficult and, comparatively, largely by deduction, and its satisfactory treatment is correspondingly difficult.

This parallel condition in the ear, so much more accessible for observation and study, can better be considered at the outset.

Serous exudate in the middle ear, if it stops short of suppuration, is absorbed with comparatively little damage to the sound-conducting mechanism; and hearing acuity, upon each inflation, is immediately restored.

A suppurative exudate, too, even if not liberated by paracentesis, will liberate itself by localized necrosis and rupture of the drum; and, though it does some damage to the sound-conducting mechanism, yet recovery is comparatively complete, including hearing acuity, in the majority of cases.

With the mucoid exudate, on the other hand, different from the other two types in every way, the hearing acuity is not restored, nor even improved, in inflation. Neither will it liberate itself by spontaneous rupture. It will, unless removed by incision of the drum and forceful suction, remain permanently in the middle-ear spaces, to organize later into that most fatal condition to the hearing function known to us all as adhesive process, which collects the largest toll of all otitic pathology and for the most part is responsible for that ever-increasing army of the "hard of hearing."

The mucoid ear, like the mucoid nasal sinus, only too often goes unrecognized by otologists, not to mention pediatricians and general practitioners. The dull, gray drum, slightly thickened and a little leathery, with little noticeable congestion, but with partially obscured markings (short process, umbo and folds), is the picture of this very mucoid ear that slips by unrecognized until

it is irretrievably too late to save its hearing acuity.

If this functional damage, above considered in the ear, were all there was to be confronted in consideration of the condition both in the nasal sinuses and in the ear, but especially in the former, it would be a small matter as compared to the far-reaching systemic damage complicating its existence in those two localities.

Except in local or neighboring pathologic processes the mucoid ear, as well as the mucoid sinus, according to my observation, experience and belief, is responsible for tremendously more systemic poisoning than is the suppurative form of disease.

The presence of suppuration in itself indicates at least attempted local defense on the part of affected structures, which also means helpful protection for the whole systemic organism. But no such apparent local inflammatory process of defense is in evidence in mucoid disease of either the ear or sinuses.

To be sure, suppurative metastases do occur at remote localities as a result of suppurative ear and sinus disease, but not to the extent that low-grade systemic poisoning is seen in chronic arthritic disease, neuritis, myositis, low-grade iridocyclitis, and so on, which to my mind is due to the largely unsuspected mucoid affections so difficult of recognition, especially in the paranasal sinuses.

What is more common to the otologist of experience and to the pediatrician than to see low-grade arthritic symptoms in children clear up promptly upon the recognition and relief of an unsuspected mucoid middle ear, with no other evidence than a "dull, gray drum, slightly thickened and a little leathery, with little noticeable congestion, but partially obscured markings"?

And, similarly, this is, I believe, the condition in the nasal sinuses, almost impossible of recognition, that, existing indefinitely, is often responsible for progressive arthritis deformans, upon which in such cases rhinologist after rhinologist has reported "nasal sinuses negative."

Dean's writing, more than anyone else's, has resulted in attentive observation in these cases on the part of pediatricians. "One sentence by Sluder, in the preface of his book, "The cessation of nasal suppuration is not always the cure of the case," has volumes of significance in the consideration of this subject, and fits perfectly into my conception of mucoid-sinus disease.

Hajek, in his book, speaks of hyperplastic sinusitis in connection with ethmoid disease only, and I think most of us, likewise, think of it only in that connection and, too, mostly as a bone process where such pathology is comparatively easy of recognition and demonstration, clinically as well as in the laboratory.

That such hyperplasia in bone, as well as in soft tissues, does take place in the other sinuses, too, has been brought out best and for the most part by Sluder. And while bone involvement, in consideration of headaches, may be a matter of "specificity of locality" (pressure upon neighboring structures), yet in consideration of systemic toxicity the process is simply a matter of pathologic activity (retention, chemical change, decomposition, absorption).

Nor is genuine hyperplasia localized necessarily to the ethmoids or to any one portion of the nasal surfaces, for Onidi and Wright, in the laboratory, show that the same pathologic process is found in the region of the bulla and uncinat process. That ozena and atrophic rhinitis are the end-result of such pathology, disseminated over sharply defined portions, or throughout the entire half or whole of the nose, corresponding to the portions adjacent to affected sinuses, would seem to be the most acceptable conclusion. As atrophy in all tissues begins just one step beyond ultimate or extreme hypertrophy, likewise it would follow that hyperplasia, which is really more rapid and more unstable hypertrophy than the usual form of hypertrophy, would be a point of election for subsequent atrophy.

It is further pointed out that nowhere else in the animal organism is bone and its periosteal covering so closely adjacent to chronically diseased surfaces as in the nose. As a consequence, the periosteum, which is the most essential nutritive medium of the bone as a whole, very soon reflects its own involvement in the disease process by the ensuing atrophy of the whole structure.

The presence of polyps and polypoid tissue in the nasal chambers by direct inspection might point, by deduction, to a corresponding condition in the adjacent sinuses, but, inversely, the difficulty is that the absence, by direct inspection, of visible disease in the nasal chambers, in the early stages of the disease, would not and can not exclude the existence of a hyperplastic or mucoid process that may be found in the sinuses, which

is so frequently not suspected by the average rhinologist. This difficulty in recognition, frequent enough in anterior nasal disease, is, of course, much greater in posterior nasal conditions.

Wright's description, in Sluder's book, of the process of spongification and absorption of normal bone in the nose, with replacement by new scar tissue of hyperplastic change, fits perfectly, it seems to me, with the accepted idea of the change in the bony capsule of the labyrinth in otosclerosis, and adds much to the parallelism of the condition in these two localities. The two localities, after all, are one and the same system of mucous-lined air spaces, and must be susceptible to the same pathologic changes.

Nasal pathology, at least in our section of the country, is mostly the result of the unnatural, precipitate change in the atmospheric-temperature living conditions that we are subjected to in going in and out of our superheated living apartments, where an alternating temperature of sometimes as much as one hundred degrees' difference is experienced between in- and out-of-doors; and where the nasal mucosa in its attempt to adjust itself to such abuse becomes so thickened and hypertrophied as to close off normal ventilation and drainage of the surrounding, communicating sinuses.

The symptomatology of this non-suppurative mucoid affection, especially in the nose, being so meager as it is objectively, largely resolves itself into subjective complaints of the patient. Except in the presence of acute rhinitis or coryza, the patient's story of long, continuous, partial obstruction in his nose, alternating from one side to the other, spoken of by the older rhinologists as intumescent catarrh, should lead us to suspect early hyperplastic disease. And the "hay-fever" patient who has his "hay fever" at intervals the year round should be carefully considered likewise. The recurring water-logged nose of the so-called "vasomotor rhinitis" patient should also be thought of as having a possible hyperplastic or mucoid sinus at the bottom of his trouble.

Post-nasal dripping, so bitterly complained of by patients who, upon inspection, show no pus or recognizable secretion, is often described as an irritation that keeps them hawking and spitting and swallowing until their pharyngeal muscles cramp, which, though not recognizable even to

them as pus or even mucopus, is nevertheless such an irritant to their soft palate and pharynx that in its path a scalding sensation is felt, as if a corrosive substance had trickled over these surfaces. The complaint of a watery drip from one nostril occasionally when stooping over, with or without an odor to the patient, which sometimes excoriates the outside skin, is a much less frequent story, but is occasionally heard.

Morning headaches, upon awakening, which are always noted by the observing patient as associated with the occurrence of transitory obstruction in one certain side of the nose, but which, nevertheless, occur independent of an acute rhinitis and without any sign of pus discharge, are likely the result of a mucoid sinus affection, and most likely of the maxillary. The midday headache of frontal sinus disease, without any sign of pus, and the occipito-nuchal headache of sphenoid disease, where repeated inspection fails to show any suppurative discharge, are also very likely of the mucoid type. And these patients frequently experience a startling and unannounced mucous coagulum of considerable size slipping into their nasopharynx, which, when in a recumbent position, brings them to their feet to expectorate it.

Whether the ultimate toxicity of mucoid sinus diseases is from bacterial toxins direct, or the subsequent chemical poisoning from retention and decomposition, I do not know, but it is generally believed that a parasite that will thrive in mucous secretion must be a rugged and hardy organism, for mucous is regarded, I believe, as bacteriocidal. At any rate, the systemic poisoning is most virulent, as seen in children especially, and, too, in adults.

I have particularly in mind a patient who, with trigeminal neuralgia (*tic douloureux*), had been in almost constant pain seizures for many days, and who was promptly relieved by the evacuation of a large mucous coagulum from the maxillary sinus of the side opposite her *tic*. She remained free of her trouble for seven months, when she again was relieved of the *tic* by evacuating a mucous coagulum the size of the white of an egg from the opposite maxillary antrum.

We have many records of patients whose low-grade arthritic symptoms have promptly ceased upon the relief afforded by antrum

windows and resultant ventilation and evacuation of mucoid accumulation.

I have a patient who, unaided, by snuffing and struggling as best he could, drew a mucous coagulum from some sinus on the right side of his nose which completely filled his mouth and, when expectorated into his cupped hand, filled it to overflowing, comparable in amount to the white of a large egg.

The prompt subsidence of systemic symptoms in children, where incision of the "dull, gray drum," followed by forceful suction, has evacuated the retained stringy mucoid mass, has been observed so many times in our experience that we feel ready to gamble on the result.

Cases of alleged hay fever and alleged vasomotor rhinitis, with definite asthmatic symptoms which are also fully relieved, so frequently get such entire relief by high septum resection, reaching to the roof from front to back, that we feel anxious to recommend it in all such cases where the crowding in the upper half of the nose is even but half of that for which in the early years of my practice I would have felt justified in recommending it.

Many times, in such crowded noses, one is astonished to find a "dog-ear-like" middle turbinate, with the bone of it entirely absorbed, and other evidences of end-results of hyperplastic process that ordinary inspection gave no hint of, including clusters of little bead-like polyps. The relief from headaches, as well as asthmatic symptoms, in these cases is usually surprising to patient and operator, and, what is most agreeable, resection of more than the submucous structures of the septum seems unnecessary, for with room and ventilation the rest clears up of itself.

No surgical procedure in rhinology, according to our experience, is capable of such a spread of beneficial application as high septum resection, reaching to the roof from front to back, in these diseased, crowded upper-half noses, where surprisingly much unseen pathology may be found after such resection, but which previously was not visible and could not be seen even with all possible shrinkage. Rarely does ethmoid or sphenoid disease exist without involving both, and the high septum resection proves equally beneficial to either and to both. The bony and cartilaginous septum may be as straight as a plumb line, with

the lower half of the nose amply open, yet the upper portion of the septum be so thick and broad as to tightly wedge itself between the other structures. So long as this condition exists in these diseased noses, resolution, or even improvement, is impossible; nor is any other but most destructive surgical procedure possible.

To repeat what I stated before, the high septum resection alone is very often the only procedure necessary to get complete relief in these cases, where, without the loss of any mucous surfaces, it is, above all others, the operation of choice; especially since local (bloc) anesthesia is so perfect for its performance. Anything short of high resection, from front to back, of the upper half of the septum in these cases will not bring the desired result.

The treatment and handling of these mucoid affections, both in the nose and in the ear, we believe to be best met by conservative surgery. Exenteration usually has no place in its application to any of the involved structures (including even the ethmoids) unless it be in case of a mucoid-mastoid labyrinth, which generally has a history of long standing, non-painful involvement. Such a patient, following an acute, low-grade otitis media, with a leathery drum which does not rupture and has little and often no discharge after paracentesis except by forceful suction, fails to recuperate his well-being and continues hard of hearing in that ear. Aside from these, his sole complaint is that the side of his head feels dull, heavy and "woodeny." Occasional neuralgia-like, shooting pains are felt in the temporal region, and deep tenderness can be elicited upon firm pressure over the mastoid. Generally these mucoid mastoids show pathology of a most unexpected extent, almost unbelievable from the mildness of their symptoms, both objective and subjective.

The process limited strictly to the tympanic cavity, aside from the continued loss of hearing, gives the patient little concern after the onset, and will continue indefinitely for weeks without rupture and discharge, showing only a dull, leathery-looking drum. If the process is not recognized, and the drum is not incised, followed by forceful suction to evacuate the mucoid contents of the tympanum, the deafness will become permanent as a result of the hard, glue-like organization of the mucoid exu-

date, and the picture of extreme adhesive process will be complete.

This mucoid process in the frontal sinus, according to our experience, has been very hard to recognize. Cases that have the unmistakable midday pain of frontal sinus trouble, but do not show pus, are likely of the mucoid type, and we have opened frontal sinuses by external operation which have contained this same mucoid (not pus), egg-albumen-like material under pressure. Enlarging the normal passage from the frontal by judicious use of the rasp, if you are fortunate enough to have it remain free and open by postoperative care, is the only intra-nasal procedure available, and usually suffices, supplemented by proper suction, until ventilation accomplishes its benefits.

The ethmoids, if not altogether polypoid, in crowded upper noses so often do perfectly following high septum resections, which gives ample room, that we look for the most gratifying results as a routine.

The sphenoids, along with the posterior ethmoids, also do so well following high septum resection to its posterior limit that opening the face of the sphenoid is not done until we observe the results of the former simple procedure.

The antra of the maxillaries are usually adequately taken care of by large windows under the inferior turbinates, after the anterior end is nipped at its attachment to the side wall and is moderately hinged upward. The window should be as low as possible, but this is hard of accomplishment owing to the ruggedness of the ridge at the floor of the side wall; and even if lowered to the utmost is not low enough to get away from the rather deep catch-basin form of the antral floors, which hold such considerable residual quantity of discharge.

Irrigation, in these mucoid sinus affections, according to my belief and experience, is only an added liability, for in case of the antra and sphenoids the irrigation water only adds to and favors absorption of the residual mucilaginous secretion, which is contrariwise to the most advantageous state of the cavities for resolution and recovery, unless it be completely removed subsequently and these catch basins be left dry, which is very difficult of

accomplishment. A water-soaked sinus mucous membrane only adds to the difficulty and is least favorable to resolution.

Suction properly carried out, it seems to me, is a most beneficial and effective therapeutic supplementary procedure after providing ample drainage and liberal ventilation, for in the beginning it is the shutting off of these very essentials that leads to the pathology under consideration.

Suction as ordinarily administered in our offices is most inadequate for the best results. The cannula, directly placed by the operator into just the place where he wishes to use suction, is, of course, not what I mean. But suction as usually and generally attempted at the nostril entrance, and which causes negative pressure in all the nasal cavities on both sides with the pulling-up of the soft palate, needs to be continued much longer than we give time to such procedure in our offices.

It is our habit to instruct the patient how it is accomplished with the ordinary water pump, which he can purchase inexpensively and attach to the water faucet at home. In this way he can continue its use for half-hour periods once or twice daily after drainage and ventilation have been provided for surgically. Suction under the patient's own control is less painful and alarming to him, and far more effective when used for longer periods of time than we ourselves would devote to it in the office; and, in addition, the passive hyperemia that he gets in the diseased sinus from such lengthened treatments is very beneficial, even if the evacuation of the cavities is accomplished in less time than the period during which he continues the suction. And it is a job that we are very happy to relinquish to anyone who can do it as well or better than we can do it in the office.

As in the comparatively recent past the blanket diagnosis of syphilis for much ophthalmological pathology has given way before our understanding of focal infection, and, too, in like manner, rheumatism has been wiped from the board, the ever-decreasing designation of cases as hay fever, vasomotor rhinitis, and so on, will, I believe, be very much thinned down by our recognition and full appreciation of non-suppurative mucoid nasal and aural disease.

CASE REPORTS

POISONING FROM CINCHOPHEN*

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A married woman, aged fifty-two years, presented herself at The Mayo Clinic in December, 1929, on account of intense jaundice of one week's duration. She had been seen first at the clinic in August, 1922, with a history of menorrhagia and intermenstrual bleeding for two or three years, and pelvic pain for several months. Examination disclosed moderate hypertension, and an epithelioma of the cervix of the uterus which extended onto the posterior vaginal wall. The fundus was large, firm and tender. A specimen taken from the tumor was diagnosed as squamous cell epithelioma, graded 3 according to Broders' classification. Radium treatments were given and a total of 3,500 milligram hours was used in five doses at intervals of a few days. Because of very severe inflammatory reaction in the pelvis, treatment was discontinued. Subsequently the reaction subsided, the vaginal discharge and bleeding stopped, and the patient's health seemed excellent.

The patient returned to the clinic eight months later for observation. She felt well, and examination revealed nothing of significance save moderate hypertension. There was no evidence of any local activity of the malignant condition and the uterus was still large, but soft, with apparent fixation in the right side of the pelvis. She returned again in December, 1928, for examination. The vault of the vagina was sealed off and smooth. The uterus was still about two and one-half times the usual size, and movable. The hypertension had increased and the patient weighed 205 pounds.

From 1923 to 1929 the patient had enjoyed excellent health. During the summer of 1929 she had suffered with neuritic pains in the right thigh, over the course and distribution of the sciatic nerve. Because a friend had found cinchophen effective in relieving pain, the patient had started taking the drug and for six weeks she had taken one to three tablets of cinchophen daily. She finally had discontinued the medicine because of the appearance of nausea and vomiting which had developed a month after she had begun to take the drug. A week after she had stopped taking cinchophen, jaundice had appeared suddenly, concomitantly with an at-

tack of diarrhea which had lasted only a day. The jaundice had been intense from the beginning and had not fluctuated. There had been no purpura or pruritus. Her home physician referred her to the clinic. He had found that her liver was enlarged but that it was smooth, not nodular.

The patient's skin and sclerotics were bright orange-yellow. Her nutrition was good and she felt well except for nausea. The systolic blood pressure in millimeters of mercury was 200; the diastolic, 110. The liver was just palpable on deep inspiration and in the course of the next few days it rapidly became smaller. Subsequently, it could not be felt. The spleen was slightly enlarged. The vault of the vagina was sealed off by dense scar tissue. The uterus seemed a little large, but was freely movable. There was slight infiltration of the broad ligaments. The neuritis had disappeared; there had been no pain since the beginning of the jaundice.

The concentration of hemoglobin was 72 per cent. Erythrocytes numbered 4,600,000, leukocytes 11,000, and platelets 120,000 in each cubic millimeter of blood. The urine contained a trace of albumin, a faint trace of a reducing substance, granular casts, and thirty-six leukocytes to the low power field. The concentration of blood urea was found to be 48 mg. in each 100 c.c. and that of the blood sugar, 87 mg. The coagulation time, as determined by the Lee method, was at first normal, but later was prolonged to twelve minutes. The van den Bergh reaction in the serum was direct, and the concentration of serum bilirubin, 39 mg. in each 100 c.c. Bile was not found in the stools, and repeated duodenal drainage failed to recover more than the faintest possible trace of color in the duodenal contents.

The patient was given a diet high in carbohydrate, calcium lactate in large doses by mouth, calcium chloride, and solution of glucose intravenously, both with and without insulin, but her condition grew steadily worse. The level of the serum bilirubin remained constant, the area of hepatic dulness as determined by percussion became smaller daily and she soon became drowsy and unresponsive, rapidly sinking into a typical state of hepatic coma on the fourth day after admission. She died on the ninth day, sixteen days after the onset of the jaundice, with terminal hyperpyrexia and signs of bronchopneumonia.

At necropsy, the liver was found to weigh only 903 gm., and it showed the typical gross and microscopic picture of acute yellow atrophy. There were small, petechial hemorrhages on the mitral valves, pleura, and mucous membranes of the stomach and jejunum, and there was evidence of terminal bronchopneumonia. Malignancy was not found on section of the uterus, cervix or vagina, but there was an increase in the fibrous connective tissue, compatible with the usual

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after-results of radium irradiation. There was a small, irregular mass in the right broad ligament, involving the right ovary, which had completely obstructed the ureter and produced right hydronephrosis. Section of the ovary revealed a hyaline necrotic mass, with regions of calcification, occasional epithelial pearls, and a few mitotic figures. However, in that portion of the mass nearest the pelvic wall, there were many mitotic figures, indicating active malignancy.

COMMENT

The case is of interest in part from the standpoint of control of malignancy with radium. Although the cervical epithelioma was considered inoperable when the patient was first seen, and she received considerably less than the usual initial dose of radium, she remained free of symptoms for almost seven years. The pain which then developed suggested pressure on the sciatic nerve, although bimanual pelvic examination failed to demonstrate infiltration in the broad ligament or enlarged iliac lymph nodes. At postmortem examination it was noted that the portion of the mass which occupied the position of the right ovary contained cells which microscopically appeared to be of low grade activity whereas the portion furthest removed from the site of the original growth and from the radiated area was made up of cells of extremely malignant appearance.

In more recent years, it has been our custom to give deep roentgen-ray treatments once every three months for at least a year following the initial radium treatment in order, if possible, to destroy the outlying carcinomatous cells which might later become reactivated, as they seem to have done in this case.

The fatal outcome in this case was related to the recurring malignant condition in that the pain which it produced occasioned the taking of cinchophen, which caused the fatal intoxication. The drug can be readily obtained without prescription. The patient continued to use it freely for at least two weeks after definite toxic symptoms had appeared. Stopping the taking of the drug in no way checked the rapidly developing hepatic atrophy. The course of the illness is typical of the course in the fulminating type of yellow atrophy of the liver. The clinical picture is usually that of a rapidly progressive, painless jaundice with gastro-intestinal symptoms of which nausea and vomiting are the most common. In fatal cases, the patients sink into a terminal comatose state after an average of about two weeks, whereas if patients recover, icterus may persist for six weeks to two months.

The destructive process unquestionably continues for many weeks after the drug is completely eliminated from the body. Therefore, while it is important to stop the drug immediately on the appearance of any toxic symptoms, prompt recovery should not be expected in every case.

In the absence of any specific treatment, general supportive and symptomatic measures should be utilized. Since it has been shown repeatedly that an abundant supply of carbohydrates protects the liver from such poisons as chloroform and phosphorus and accelerates recovery from the hepatic injury induced

by these poisons, it is rational to force the intake of carbohydrates by mouth, by proctoclysis and by vein. According to Minot and Cutler's work, calcium likewise has a protective action for the liver. Given by mouth or intravenously its use seems logical, and certainly does no harm. It must be admitted, however, that the measures now employed in the treatment of cases of acute yellow atrophy are most inadequate and apparently influence the outcome very little.

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SODIUM AMYTAL IN CESAREAN SECTION

REPORT OF CASE

J. R. STURRE, M.D.
Minneapolis

Sodium amytal has been previously used in cesarean section. In reviewing the literature I find that Mendenhall¹ reports an hysterotomy on a woman in toxemia with convulsions, with a dead six months fetus.

In another report, Mendenhall mentions that several cesarean sections have been done. However, he does not go into detail in these reports on the effects of sodium amytal on the fetus. His first report deals with a dead fetus, so that, in this respect, this hysterotomy can be considered a laparotomy.

There has been much controversy locally on the effect of sodium amytal on the fetus, when used in obstetrics. It is claimed by some that the babies are depressed and hard to resuscitate. Believing that sodium amytal could be safely administered to a pregnant woman without injury to her fetus I employed this drug in the following case.

This woman, aged 22, a twin and a primipara, weighed ninety-eight pounds when first seen in the second month of her pregnancy. Her pregnancy was normal in every way throughout.

Her physical examination was normal except for her pelvic measurements.

Her family history was negative. Her twin sister is living and well.

Pelvic measurements: Int. Sp. 23—Int. Cr. 25—Ext. Conj. 17—Int. Conj. 8—Bi. T. short 7—Ant. Sag. 7—Post. Sag. 8. Baby estimated at eight pounds. The patient's weight at term was 132 pounds.

Labor began at term at 8 p. m., Feb. 4, 1930. She entered the Midway Hospital in St. Paul at 3:30 a. m. Feb. 5, 1930. Contractions were regular and severe, occurring every few minutes. She had an acute cold and was coughing considerably. Rectal examination was made at this time and the cervix was found to be dilated to a breadth of two fingers and the head not engaged.

At 4:30 a. m., one hour later, the findings were still the same. At this time 1 Gm. of sodium amytal was

dissolved in 10 c.c. of distilled water and 7.5 c.c. were given intravenously. She went to sleep immediately. Her pains continued regularly and at 5:30 a. m., one hour after the administration of the sodium amytal, she was sent to surgery for cesarean section. Here I picked up her skin on the abdomen with an Allis forceps and closed them to the second catch on the instrument and made traction on the skin. There was no evidence of sensation.

A very small amount of nitrous oxide was given with 60 per cent oxygen. The cesarean was completed in twenty-two minutes.

On incising the uterus, a small uterine incision was made. Through this the baby immediately presented an arm by its own muscular action. I placed this arm back into the uterus and, inserting my hand, grasped a foot and extracted the baby by version. The child was very active and cried immediately as the head was brought out. The thighs had to be held out of the way as the cord was clamped because of the baby's active movements. The color of the child was pink. There was absolutely no depression in any manner and no respiratory embarrassment at this time or later. The baby weighed exactly eight pounds.

The mother's uterus contracted at once and bleeding was not more than moderate.

In reporting this case I am not attempting to prove anything. However, because I can find no similar case that has been reported in full giving the effect of this drug on the child, I am making this report. In my case the drug was given over an hour before operation was begun. This gave time for maximum absorption of the drug by the baby and not sufficient time for recovery on the baby's part from any depression which might have resulted.

Nitrous oxide was not necessary but was given to insure that the patient would not rouse enough to interfere with the operation. However, the anesthetist said she did not give her enough nitrous oxide to make her dizzy.

Oxygen was given for obvious reasons.

Assistance was rendered by other members of the surgical team, consisting of Dr. N. P. Bentley, first assistant; Dr. A. M. Smith, second assistant (interne); and Miss Helen Cook, R.N., anesthetist.

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EFFECTS OF CINCHOPHEN

Purpuric, urticarial, or scarlatiniform eruptions have been reported by many observers following the administration of cinchophen. They may occur with or without edema. Gastro-intestinal disturbances, from epigastric discomfort to acid eructations and heartburn, are the commonest expression of intolerance to cinchophen. These may be avoided by the giving of an abundance of water with the drug, and 1 Gm. of sodium bicarbonate, though the latter should be given separately and not mixed with the drug. By using neocinchophen, one may avoid usually the symptoms of gastric irritation. Sometimes cardiovascular disturbances have been noted. By far the most serious results of cinchophen intoxication result from injury to the liver, which may even go on to a fatal acute yellow atrophy. (*Jour. A. M. A.*, January 25, 1930, p. 283.)

QUICAMPHOL (TRANSPULMIN) NOT ACCEPTABLE FOR N. N. R.

In 1927 the Council on Pharmacy and Chemistry considered Transpulmin, offered by the Chemisch-Pharmazeutische A.-G., Bad Homburg, Germany, "for the painless parenteral quinine-therapy in inflammatory affections of the lower air passages." The Council found the preparation unacceptable and submitted its findings to the German firm. The firm adopted the name Quicamphol for the preparation and took other measures in an effort to make the product acceptable. Quicamphol is now sold in the United States by Spicer and Company, which firm offers it "for intramuscular injection in bronchitis, pneumonia, and pulmonary infections generally." The Council declared Quicamphol (Transpulmin) unacceptable for New and Non-official Remedies because the claims for the value of the preparation in the treatment of lobar pneumonia, influenza, etc., are unsupported by satisfactory clinical evidence (*Jour. A. M. A.*, November 9, 1929, p. 1471.)

PRESIDENT'S LETTER

THE organization of men into groups for their mutual protection or gain dates back into very ancient times. Organized activities have varied with changing conditions and advancing civilization but the underlying principles animating all social organizations have remained unchanged, because human nature remains basically the same today as it was in the beginning.

The congestion of peoples into great populations of both rural and urban types, the growth of industrialism, the expansion of knowledge, the figurative contraction of distances by virtue of our modern means of quick communication, have given rise to tremendous social problems which are challenging us for solution.

Society is striving to understand the conditions in which it finds itself, is courageously attempting to untangle the maze of conflicts, is seeking to find the way to establish social, industrial and economic justice. Manifestly society as a whole cannot act intelligently on each of the great multiplicity of problems to be considered, therefore quite naturally groups with common interests have formed themselves into organizations for the purpose of studying their own needs, their relations to other groups, their position in relation to society as a whole, the best means of serving themselves, each other and that which they themselves compose—the public.

Thus we have financial organizations, labor organizations, industrial and agricultural groups, social welfare, child welfare, lay health bodies and what not. It is small wonder that in the earnestness of their activities they cross paths or seem to, and often find themselves in conflict with each other.

The professional and scientific bodies have been the playthings of the other groups to a very considerable extent. This fact has touched the medical profession more directly, perhaps, than it has the others. The old austere spirit of professional aloofness has long held sway within our ranks. Even yet there are many of us who feel that it is beneath our dignity to enter into active solution of medical economic problems, except as individuals. However, the field men of medicine, they who are at the bedsides of the sick and injured, while accepting themselves as men of science, none the less realize that they earn their living by caring for the sick. Their professional spirit gives them primal interest in helping their patients. Their pecuniary interest is secondary. The professional spirit cries out for untrammelled scientific freedom. The spirit born of ancestral independence of action likewise cries for freedom. It instinctively rises rebelliously against economic thralldom.

Our purely scientific organizations found it necessary to add to their activities a phase which we are pleased to call medical economics. This field has broadened until we now find that the Minnesota State Medical Association has at least eleven committees engaged in studying our problems in relation to the public, to various technical services, to exogenous groups of healers, to the procedures of the Department of Public Health, to public health education and to other closely related matters.

The great swing and scope of education got under way while we slept, so to speak, or worshipped at the shrine of science, wholly unmindful of what was happening. Suddenly we began to realize that the medical profession was losing its one time position of honor and prestige. Because of our self centered and narrow attitude we were relinquishing our function as public educators and to just that extent failing in our professional duty. Whereas a generation ago the doctor worked as an individual, was professional advisor, political counsellor, general all around sage and burden bearer, now the scenes had changed and collectivism had come to be the mode of action. Soon we found an impatient public was carrying on its own system of health propaganda and education. Evidently if we were not going to do it the public would do it themselves, though not always to their best advantage but certainly to our disadvantage.

Then we woke up! The result has been one of splendid accomplishment. Today we have an aroused profession, aroused to its public responsibility, working organically as a unit. It is taking the lead as an organized body in all of the many movements in which medical lore can be of service. It no longer stands idly by while its larger work is being mismanaged by others. It is guiding, wisely directing, helping. It is thrusting aside the ill informed, less than half trained, self seeking group who had the pretensions to teach the laity. Such were accepted for a time on many occasions by lay organizations, but only because we ourselves were not available.

Organization has redeemed our honor. We should rejoice. But organization and the work it entails which devolves upon us is costly. That is why state society dues have been raised. That is why, having placed our shoulders to the wheel, we must keep them there, lest we step back into the quagmire of dishonor.

S. H. Boyer

President,
Minnesota State Medical Association.

EDITORIAL

MINNESOTA MEDICINE

Official Journal Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine, and Minneapolis Surgical Society.

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Vol. XIII May, 1930 No. 5

POISONING FROM CINCHOPHEN

When cinchophen was first introduced to the medical profession in 1908, it was advocated as a specific analgesic in gout. For many years its use was restricted to gout and conditions thought to be of gouty origin. Gradually, as it became apparent that its power to relieve pain was not specific, it was prescribed in other conditions, and has been widely used in all sorts of painful affections, not only by the medical profession but by the public at large and even in proprietary and patent medicine mixtures.

Partly because of its restricted administration in the first decade of its use, it was considered

to be relatively innocuous and safe when given in large doses over long periods of time. But in 1922, Schroeder reported seventeen cases in which various toxic manifestations had followed the ingestion of cinchophen. Since that time, many reports of toxic effects from cinchophen have appeared, with gradually increasing frequency. These effects have varied from urticaria, and toxic cutaneous rashes, to gastro-intestinal disturbances and serious hepatic toxemia, frequently terminating in yellow atrophy and death. In August, 1929, Reichle reviewed forty-seven case reports which had appeared in the literature. Eleven of the patients had died of toxic jaundice. At The Mayo Clinic, four patients who had taken cinchophen or derivatives of cinchophen at home have died from disorders definitely attributable to the drug; two others, with icterus of moderate severity, ultimately recovered after discontinuing the drug. Because of our experience with these cases, we now make careful inquiry concerning previous ingestion of drugs of all patients who present themselves with jaundice, especially in cases in which the jaundice is from intrahepatic causes. If this inquiry is always made the diagnosis of intoxication from cinchophen will be made more frequently. Since the pathologic picture in these cases differs in no way from that of the idiopathic form of acute yellow atrophy, in order to make the diagnosis it is necessary to correlate the pathologic data with the clinical history, especially as it pertains to previous medication.

Apparently it is not recognized generally that cinchophen is a dangerous remedy. In large part this may be due to the fact that most of the cases reported have been published in journals which do not have wide circulation in this country. That some of the manufacturers of the remedy appreciate its toxic potentialities is evident by the cautions which accompany packages of their preparation, advising that the drug be discontinued immediately if any gastro-intestinal symptoms occur. Unfortunately, however, after gastro-intestinal symptoms have manifested themselves, the injury has been done, and stopping the drug often is ineffective in checking the

progress of the toxemia. In fact the first symptoms have been known to appear even after the medication has been stopped.

There appears to be marked variation in individual susceptibility to cinchophen. One man seen at The Mayo Clinic had taken it almost daily for thirteen years without any ill effects, whereas in another patient pruritus developed after the first dose. The latter patient continued to take the drug and subsequently died of sub-acute yellow atrophy. In another instance the preparation was administered for more than six months before gradually developing jaundice appeared; the jaundice subsided after medication had been stopped.

It has been thought that impurities in the product might be responsible for the toxic properties rather than the drug itself. In the case of poisoning from cinchophen reported in this issue by Stacy and Vanzant, the preparation used was of the highest quality. A conjecture also has been advanced that those people who are sensitive to cinchophen break down the molecule in some abnormal way, producing toxic products. This has not been proved but the subject is being investigated under a grant from the American Medical Association at the present time.

Cinchophen often has been administered interchangeably with the salicylates, but by the use of cinchophen the patients are unnecessarily subjected to risk. As this becomes better known among the members of the profession, undoubtedly cinchophen will be prescribed less; other and safer analgesic drugs will be given preference. Meanwhile, however, pharmacists will continue to sell directly to the public countless packages of a dangerous drug, and patent medicines containing this drug still will be compounded. This uncontrolled sale should be regulated either by legislation, or by publicity, or by both.

L. G. ROWNTREE, M.D.

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YALE'S INSTITUTE OF HUMAN RELATIONS

The mere announcement that Yale University is establishing an Institute of Human Relations sounds as fantastic and presumptuous as the proposal of H. G. Wells to write a History of the World. And yet Mr. Wells did it and it looks as though the few remaining millions necessary to round out the building and endowment program of the so-called Human Welfare Group will be forthcoming. This group will consist of the Yale Medical School, the Yale School of Nursing, the New Haven General Hospital and Dispensary, and this so-called Institute of Human Relations, the whole representing an investment of some thirty-five million dollars.

This old world is not doing as well as it should. Phenomenal progress has been made in recent years along material lines. Science has done wonders through inventions which have substituted the machine for man power, has greatly speeded up transportation by land, sea and air and has made the individual a world citizen through inventions which have facilitated worldwide communication. And yet there is serious question whether the human being is any nearer the goal of real happiness than he was before all this scientific and material progress was achieved. Medical science has lengthened life expectancy and has reduced the prevalence of disease as a whole, but that remnant of barbarism—war—has not been outlawed. Suicide is on the increase. Poverty and unemployment in spite of great national wealth is still with us. Law violation has shown a tremendous increase in recent years. Hospitals for the insane and institutions for the feeble minded are full to overflowing.

Many agencies, religious, moral, social, governmental, medical, etc., are working along their respective lines in an effort to better human conditions. But there has been a surprising lack of correlation of these various activities. This correlation is what the Institute of Human Relations is going to attempt. The Institute in addition to being closely associated with the medical activities of Yale University will also be affiliated with the divinity and law

schools, and the departments of psychology and sociology. Thus all university activities which have to do with man's mental, physical and social welfare will be brought together to some extent under the one roof of the Institute. Research will be an important part of the Institute's work. Members of the graduate schools of medicine, law and divinity will also have the benefit of instruction in other matters bearing on human welfare than their own.

There are certain subjects which might well be added or substituted if need be in undergraduate medical instruction of today, to advantage. As a result of present-day medical training it is only too easy for the young physician to see only the physical side of the patient and to forget that his mental attitude, family and financial worries may play an important part in his complaint. We can see a distinct advantage in undergraduate instruction in psychology and sociology in furnishing the young physician of today with that something so valuable in the handling of patients which the family doctor of yesterday possessed in such large measure.

Such a praiseworthy attempt to evolve some solution for some of the tremendous social problems of today merits the support of serious minded capitalists. That the Institute of Human Relations has obtained the generous support of such individuals as well as grants from the Rockefeller Foundation, the General Education Board and the Commonwealth Fund, is evidence of the sense of custodianship alive in at least some of our wealthy citizens. The results of this undertaking which seems almost in the nature of an experiment, will be awaited with considerable interest by medical men especially.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

STATE OF MINNESOTA VS. BOYD T. WILLIAMS

Above defendant, who has been conducting a cancer sanatorium in Minneapolis, and who was convicted by a jury of practicing healing without a basic science certificate, paid a fine of \$250.00 to the Clerk of the District Court of Hennepin County on Monday, March 24, 1930. Following the defendant's conviction, a stay of execution of sentence was granted to enable Williams to appeal his case to the Supreme Court. However, the plans for perfecting the appeal were abandoned upon the payment of the fine.

COMMUNICATION

AMERICAN MEDICAL ASSOCIATION

October 25, 1929.

Dr. E. A. Meyerding, Secretary,
Minnesota State Medical Association,
11 W. Summit Ave.,
St. Paul, Minnesota.

Dear Dr. Meyerding:

Your letter of October 22, regarding the Midwest Company, has been referred to me.

The Midwest Company is a trade style used by Mr. James C. Fifield and his wife, in partnership. It is the intention of Mr. Fifield to get up a so-called biographical directory of American physicians and surgeons, comparable in its field to the book that Mr. Fifield issues—"The American Bar"—having a legal field.

"The American Bar" is a reputable publication that is held in fairly high esteem by men in the legal profession. The book comprises brief biographical sketches of various members of the American bar, the sketches being even less detailed than those that appear in "Who's Who." So far as we have been able to learn, there is no commercial taint to this book. The book itself, we might state, sells for \$30.00 a volume.

Mr. Fifield seems to be thoroughly reliable and honest and gives every evidence of wanting to make his proposed "American Physicians and Surgeons" just as reliable a publication as "The American Bar."

The method to be used by Mr. Fifield and his agents in determining the eligibility of individual physicians and surgeons for inclusion in his proposed book is that of taking the names of Fellows of the American Medical Association, of the American College of Surgeons and of the American College of Physicians, and have his representatives call on them. We understand that each physician called on has submitted to him a certain number of names of the other eligible group in the same locality, and the physician is asked whether, in his opinion, such men should be eligible to inclusion in the proposed book.

Mr. Fifield is also considering soliciting advertisements for the proposed directory. He tells us, in a letter received recently, written in answer to some specific questions we put to him on the point, that his plan is to confine his advertising to such advertisers as are accepted by the publications of the American Medical Association.

He tells us, further, that his representatives, who are calling on doctors, are at the same time attempting to secure orders for the book. As we see it, there can be no serious objection to this plan, provided, as we have said to Mr. Fifield, it is made quite plain to the physicians that a subscription is not, in any sense of the word, a *sine qua non* for eligibility to the book.

Very sincerely yours,

ARTHUR J. CRAMP.

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

That the medical profession is already in partnership with the profession of public health in the field of health education is clearly indicated in this interesting survey of the membership of the leading health and medical associations of the country and the programs of two of their recent biggest meetings. The survey was just completed by Dr. R. O. Beard for the information of the public health education committee of the Minnesota State Medical Association.

It shows that a large army of public health workers neither practice medicine nor hold an M.D. degree. Among them are public health teachers, sanitary engineers, sanitary chemists, psychologists, sociologists and public health nurses.

Such persons as these are sharing control of the profession of public health with the medical profession. Their qualifications for the work are as substantial and important, in the opinion of Dr. Beard himself, as those of the medical profession, many of whom are not, themselves, qualified for public health work.

At any rate, it is entirely fitting, in his opinion, that both should grow together side by side, sharing equally in the great cause of health education for the public at large.

Dr. Beard's report follows:

RESULTS OF STUDY OF HEALTH AND MEDICAL ASSOCIATIONS

The Membership of The American Public Health Association of 1929 consists of:

- | | |
|--|--------------|
| (a) Those who by education, experience, interest and appointment are exclusively engaged in public health work, and who do not hold the Degree of M.D., in the proportion of..... | 52 per cent |
| (b) Those who hold the Degree of M.D., but are exclusively engaged in public health work, in the proportion of..... | 18 per cent |
| (c) Those who hold the Degree of M.D., and who are practitioners of medicine, but are interested in, and more or less employed in, public health service to the proportion of..... | 30 per cent |
| Total | 100 per cent |

The membership of the American Child Health Association of 1929 consists of:

- | | |
|---|--------------|
| (a) Those who by education, experience, interest and appointment are exclusively engaged in public health work, and who do not hold the Degree of M.D., in the proportion of..... | 58 per cent |
| (b) Those who hold the Degree of M.D., but are exclusively engaged in public health work, in the proportion of..... | 24 per cent |
| (c) Those who hold the Degree of M.D., and are practitioners of medicine, but are interested in, and more or less employed in, public health service in the proportion of..... | 18 per cent |
| Total | 100 per cent |

The 1929 program of the American Public Health Association and related public health organizations, meeting in Minneapolis, offered addresses, articles or papers to the number of.....185

Of these, the number contributed by public health workers, without medical degrees, was.....132, or 71.3%

The number contributed by writers holding the Degree of M.D., but engaged exclusively in public health work, was.....33, or 17.9%

The number contributed by writers holding the Degree of M.D., which were of combined medical and public health interest was.....20, or 10.8%

The 1928 program of the American Medical Association, meeting in Minneapolis, offered addresses, articles or papers to the number of.....296

Of these, the number contributed by practitioners of medicine and bearing upon the causes, diagnosis or treatment of disease were.....261, or 88 %

While the number contributed by Doctors of Medicine and devoted to the discussion of topics related to preventive medicine, public health, and public health education were.....25, or 12 %

The 1930 program of the American College of Physicians, meeting in Minneapolis, offered addresses, articles or papers to the number of.....245

Of these, the number contributed by practitioners of medicine, and bearing upon the causes, diagnosis or treatment of disease was.....231, or 94 %

While the number contributed by Doctors of Medicine and devoted to the discussion of topics related to preventive medicine, public health or public health education were.....15, or 6 %

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 10:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and St. Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of May will be as follows:

- May 7—Your Hospital
- May 14—Blue Ribbon Children
- May 21—Cirrhosis of the Liver
- May 28—Cause of Headache

MINNESOTA RADIOLOGICAL SOCIETY

The Minnesota Radiological Society, a new organization for the study and advancement of radiology, held its first formal meeting at the Mayo Clinic, Rochester, Minnesota, on March 1, 1930. The following program, prepared by Dr. B. R. Kirklin, was presented.

1. "Roentgenologic Manifestations of Malignant Disease in the Colon," Dr. H. M. Weber.
2. "Gastro-Jejunal Ulcer," Dr. J. D. Camp.
3. "X-ray Studies on Tuberculous Spine and Shoulder in Children," Dr. R. K. Ghormley.
4. "Mediastinal Empyema," Dr. Jacob Sagel.
5. "Roentgen Diagnosis of Small Pleural Effusions," L. G. Rigler.
6. "Specific Radio Sensitiveness of Cells and its Significance to Radio Therapy," Dr. A. U. Desjardins.
7. "A Radium Technique in the Treatment of Carcinoma of the Cervix Uteri," Dr. R. E. Fricke.
8. "Results Obtained from Irradiation Therapy in Cases of Carcinoma of the Cervix Uteri," Dr. H. H. Bowing.

A banquet was held that evening at which the following addresses were given:

- "Use of Iodized Oil in Gynecological Diagnosis," Dr. L. M. Randall.
- "Preliminary Report of Intravenous Urography by Means of Uroselectan," Dr. C. G. Sutherland and Dr. W. F. Braasch.

The next meeting will be held in Duluth, Minnesota, in connection with the meeting of the Minnesota State Medical Association, in July.

KIDNEY SYMPOSIUM

A symposium on the kidney in health and disease will be held at the University Medical School, Minneapolis, July 7 to 18, 1930. Various phases of a limited part of the field of internal medicine will be presented by a number of physicians whose names are familiar to medical men both in this country and abroad.

Physicians are invited to attend the meeting, registration for which will take place at 9 A. M., Monday, July 7, at the Eustis entrance of the University Hospital. There will be no registration fee. Registration may be made in advance to Dr. Hilding Berglund, University Hospital, Minneapolis. Dormitory accommodations will be available to those who register before June 1.

The program includes the following:

- Dr. A. J. Carlson, University of Chicago
- Dr. G. Carl Huber, University of Michigan
- Dr. E. K. Marshall, Johns Hopkins Medical School
- Dr. R. E. Scammon, University of Minnesota
- Dr. C. M. Jackson, University of Minnesota
- Prof. F. Volhard, Frankfurt-on-the-Main
- Dr. A. N. Richards, University of Pennsylvania
- Dr. E. T. Bell, University of Minnesota
- Dr. R. N. Bieter, University of Minnesota
- Dr. H. L. White, Washington University, St. Louis
- Dr. W. F. Longcope, Johns Hopkins Hospital
- Dr. Paul B. Rehberg, University of Copenhagen
- Dr. L. G. Rowntree, Rochester, Minnesota
- Dr. H. Berglund, Rochester, Minnesota
- Dr. A. D. Hirschfelder, Rochester, Minnesota
- Dr. L. Leiter, University of Chicago
- Dr. R. A. Gortner, University of Minnesota
- Dr. Harold Diehl, University of Minnesota
- Dr. McN. Wetherby, University of Minnesota
- Dr. H. P. Wagener, Rochester, Minnesota
- Dr. G. E. Fahr, University of Minnesota
- Dr. N. M. Keith, Rochester, Minnesota

The program will consist of morning and afternoon sessions.

MINNESOTA SOCIETY OF INTERNAL MEDICINE

The next meeting of the Society of Internal Medicine will be held at Duluth, Monday, May 26, 1930.

MINNESOTA STATE MEDICAL ASSOCIATION

The annual meeting of the Minnesota State Medical Association will be held in Duluth, July 14, 15 and 16, 1930.

Addresses will be given by the following:

- Dr. Karl Meyer, Associate Professor of Surgery, Northwestern University
- Dr. Ludwig Hektoen, Chicago
- Dr. W. J. Mayo, Rochester
- Dr. Ralph Kinsella, Professor of Internal Medicine, St. Louis University
- Dr. E. C. Davidson, Detroit
- Dr. R. S. Dixon, Detroit

Symposia on Traumatic Surgery, Carcinoma, Rheumatic Fever, Anesthesia, Therapy, and Our State Institutions, have been arranged.

Dr. Olin West, secretary of the American Medical Association, J. G. Crownhart, secretary of the Wisconsin State Medical Association, and W. J. Burns, secretary of the Wayne County Medical Society of Detroit, will speak at the Medical Economics meeting.

The Duluth profession is making extensive prepara-

tions for the meeting. All committees are appointed, President S. H. Boyer reports, and they are already working together under the general chairmanship of W. A. Coventry.

Following are other committee heads recently appointed: C. H. Scherer, banquet and entertainment; L. R. Gowan, civic clubs; E. Z. Shapiro, publicity; L. A. Barney, convention halls; J. F. Lepak, exhibits; C. L. Haney, reception; Gordon McRae, reunions and luncheons; B. F. Davis, hotel accommodations, and R. A. Nelson, sports. F. H. Magney and P. F. Eckman are vice-chairman and secretary, respectively, of the general committee.

One medical man remarked that he was attending the meeting for no other reason than to learn something about what his patients pay him for. He hoped other programs would imitate the state meeting and include more therapy for a change, he said.

Hotel reservations for members should be made through Dr. Ben F. Davis, 25 North Tenth Avenue East, Duluth, Minnesota.

AMERICAN COLLEGE OF PHYSICIANS

FIFTEENTH ANNUAL CLINICAL SESSION

The American College of Physicians will hold its Fifteenth Annual Clinical Session at Baltimore, Maryland, from March 23 to 27, inclusive, 1931. The Lord Baltimore Hotel will be headquarters.

Dr. Sydney R. Miller, Baltimore, as President, will have charge of the selection of the general scientific program. Dr. Maurice C. Pincoffs, of Baltimore, has been appointed by the Board of Regents as the General Chairman of the Session, and will make all local arrangements, including the making up of the program of clinics. Business details will be handled by the Executive Secretary, Mr. E. R. Loveland, from the College headquarters, 133-135 S. 36th Street, Philadelphia, Pa.

The attention of secretaries of various societies is called to the above dates, in the hope that their societies will select non-conflicting dates for their 1931 meetings.

STEARNS-BENTON COUNTY MEDICAL SOCIETY

The Stearns Benton County Medical Society met at St. Cloud, Minn., April 17, 1930.

The program consisted of the following papers: "Medical Economics," H. L. Gornello, St. Cloud; "Medical Legislation," Dr. Savage, St. Paul; "Public Health," Dr. G. Earl, St. Paul.

Motion that endorsement of present \$15.00 state dues be continued was passed.

Election of officers resulted as follows: E. M. Kingsbury, Clearwater, President; H. B. Clarke, St. Cloud, Vice President; F. J. Schatz, St. Cloud, Treasurer; P. E. Stangl, St. Cloud, Secretary; R. N. Jones, St. Cloud, Censor; Delegate to State, C. B. Lewis, St. Cloud; Alternate, Geo. Sherwood, Kimball.

P. E. STANGL, Secretary.

WOMAN'S AUXILIARY *Minnesota State Medical Association*

Minnesota County Medical Auxiliaries and Their Presidents

Blue Earth County—Mrs. A. A. Passer, Olivia, Minnesota.

Camp Release Co.—Mrs. J. S. Holbrook, 419 South Broad Street, Mankato, Minnesota.

Hennepin County—Mrs. James Blake, Hopkins, Minnesota.

McLeod County—Mrs. Thos. Trutna, Silver Lake, Minnesota.

Park Region—Mrs. W. W. Draught, Fergus Falls, Minnesota.

Ramsey County—Mrs. E. M. Hammes, 1456 Summit Avenue, St. Paul, Minnesota.

Red River Valley—Mrs. H. Froehlick, Thief River Falls, Minnesota.

Rice County—Mrs. Joseph Moses, Northfield, Minnesota.

Stearns-Benton—Mrs. W. B. Richards, St. Cloud, Minnesota.

St. Louis County—Mrs. F. W. Spicer, 1631 East Fifth Street, Duluth, Minnesota.

Washington—Mrs. O. B. Freligh, Stillwater, Minnesota.

West Central—Mrs. C. Frank Ewing, Wheaton, Minnesota.

Wright County—Mrs. G. H. Norris, Annandale, Minnesota.

State President—Mrs. J. D. Lyon, 3617 Pleasant Avenue, Minneapolis, Minnesota.

The word "auxiliary" is defined by the Standard Dictionary as "giving or furnishing aid or support, especially in a subordinate or secondary manner—supplementary—accessory." I take the liberty of presenting this definition because it so well expresses the real objects and purposes of any Auxiliary to any Medical Society, and at the same time so definitely states the limitations, about which I believe there should be a clear understanding, to avoid future trouble.

Joining and taking an active part in the Woman's Auxiliary could very well be ranked as the first activity which any physician's wife should assume outside her home. The immediate welfare of physicians and their families and the future of medical practice depend upon what the public thinks and does with regard to medical practice and health activities. Organized medicine exists largely for the scientific advancement of its members, the betterment of the profession, and proper guidance of health activities. Except for scientific education, practically every purpose of organized medicine can be as well, or better, accomplished by a woman's auxiliary than by a medical society itself. Some of these activities are: The promotion of friendliness, the guidance of health activities, and health education.

It is generally true that physicians' wives are, or can easily become, active in the public health pro-

grams of the various lay organizations whose work is everywhere impinging upon medical practice. These lay health organizations accomplish great good both for the public and the profession, and auxiliary members can very easily see to it that the various lay activities with which they are connected are conducted in a way that meets with the approval of the physicians in their county. In this way a possible liability can easily be turned into a tremendous asset.

One of the favorite forms by which quackery propagates itself is through lectures offered to women's clubs and other lay organizations. The State Medical Society has a speakers' bureau which can send qualified physician speakers to any or all lay meetings. The members of the Woman's Auxiliary could very easily eliminate faddists as club speakers and also find dates for members of the state society speakers' bureau. Lay education of this sort will destroy the cults faster than any laws.

Scientific medicine needs the coöperative aid which can come through such auxiliaries. Whatever makes for better understanding between physicians and their families makes for better organizations. Nowadays women's clubs exercise a strong influence on civic affairs. A state woman's auxiliary of the Minnesota Medical Association, composed of component county woman's auxiliaries, can become a real factor in promoting public health work.

A perusal of the rules laid down by the Auxiliary to A. M. A. and to the State of Minnesota will show that the interests of the profession and of the lay public have been constantly kept in mind. A county woman's auxiliary, working along legitimate lines, can be of real aid and service, both to the profession and to the laity. The members of such an auxiliary can maintain contacts and promote interests and activities vitally concerned with the public health, and can do work for which busy physicians only rarely can spare the time.

MISCELLANEOUS

THE PRACTITIONER AND THE MEDICAL SOCIETY LIBRARY

There should be little need of speaking to physicians about the importance of a medical library. The priest physicians and astrologers and later the physicians and alchemists preserved the records of science while priests and monks preserved literary and religious records. The tradition has persisted. In many numerous visits to physicians' offices, I can recall none where there was not somewhere in sight at least a bookcase or a shelf in which there was not—also "at least"—the residual text-books used in the practitioner's medical school course, a pamphlet or two attesting attendance at medical conventions and a more or less aging pile of the *Journal of the American Medical Association* or some similar professional periodical.

In times not very remote the physician's library was somewhat indicative of his professional status. Not

infrequently it was an asset to his estate or passed on to his successor in practice. For a long while medical theory and practice were fairly stationary. Really revolutionary literature appeared at sufficiently lengthy intervals to make it possible to keep such a collection fairly well up to date even though cupping and leeching ceased to be common, and jalap, blue mass and calomel successively lost their prestige.

In latter days, the private medical library is not keeping pace with the mechanical equipment and artistic, decorative appeal of medical offices. The reason is not far to seek. It would be carrying coals to Newcastle to speak even briefly of the manifold changes in theory, technic and practice in the profession. In fact, most physicians would consider it presumptuous for a layman to do so. The auxiliary sciences which contribute to the number and rapidity of these changes are many. They range from photography to glassmaking, from chemistry to papermaking. It is said that five hundred current periodicals of medical emphasis would be needed to make any medical library really first-class and perhaps two or three times as many more to make it approximately complete. Monographs and text-books are increasing at a similar rate. All of these are expensive to produce and the publishers do not list them at below cost prices. If the reports of the average income of physicians are correct, there are very few communities in which many practitioners could approximately keep up to date even in a special field. Moreover, the shelf room required to house the additions would soon tax the capacity of any private office. It is this relation to other library fields which gives a mere layman his excuse for speaking of medical libraries.

To meet these rapid changes, physicians seem to have developed several methods. All involve coöperation, whether the method selected is attendance at special short courses connected with hospital or medical school; attendance at even shorter courses in the form of professional conventions; formation of group clinics; or by the formation of clinic or medical society libraries. No surgeon, however skillful, even considers the acquisition of complete surgical equipment. Instead of adopting the plumbers' method of going back for tools after looking over the job, he and his patient, after the preliminary diagnosis, go to the hospital, or clinic, where combined resources have provided equipment and environment beyond the possibility of individual purses. Instead of stocking his back office with cabinets filled with jars of tablets or pint bottles of suitably colored and flavored liquids, he writes prescriptions which only the well-stocked pharmacy can be expected to fill.

Recognition of a similar need of coöperation in medical literature has fostered the foundation of medical libraries for common use wherever there is a fair-sized group of physicians, be they specialists or general practitioners. Nevertheless, it may be questioned whether medical libraries are used to more than a fraction of their potential value. Too often their care and organization are left to the leisure time of skilled phy-

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CONSULTATION BUREAU

WM. A. O'BRIEN, M.D., Director
Minnesota State Medical Association
 11 West Summit Avenue
 Saint Paul, Minnesota

1. *Question*.—I have a young man who states that he wore a condom during sexual intercourse several weeks ago. About three weeks after exposure he noticed a sore on the penis. It gradually enlarged to the size of a ten cent piece, and was oval shaped. At present it is indurated but not painful. The right inguinal glands are enlarged and slightly tender. The left inguinal glands show slight enlargement but are not painful. I suspect that the lesion is a primary syphilitic affair. I wish to start treatment early if it is syphilitic and would like your advice as to the best way of making an early diagnosis.

Answer.—An early diagnosis of syphilis may be made by examining material from the ulcer for spirochetes. This may be done by a dark field examination. In addition, it is advisable to take a blood Wassermann. Although the blood Wassermann is not positive in from thirty-five to forty-two days after infection, spirochetes may be found from fifteen to eighteen days after inoculation. It is necessary to have your microscope and field ready for this examination, as it cannot be sent a distance to have it done. Unless you care to wait for the blood to become positive, it would be advisable for you to have the examination done elsewhere if you are not accustomed to doing these examinations yourself.

2. *Question*.—I wonder if you could give me information about a new drug called "Tethralin," which is said to be used with success in the treatment of trigeminal neuralgia.

Answer.—"Tethralin" (trichlorethylene) is the drug you have in mind. It was discovered accidentally that this drug had an effect on the trigeminal nerve of workers in a factory where it was used. It was thought from this observation that perhaps there was some specific effect on the trigeminal nerve, and it was therefore tried in cases of neuralgia. About twenty drops are placed on cotton and sent into the nose during an attack. Approximately half the people using the treatment reported it successful. It is worthy of trial and should be used as indicated above.

3. *Question*.—I have a young girl, eighteen years old, who has had psoriasis for the past year. I have tried thyroid extract, Fowler's solution, salicylates, and milk injections without getting any favorable results.

Answer.—It must be kept in mind that psoriasis is a chronic, recurring disease. Therefore, no treatment that might cause serious consequences should be used unless one has had a large experience in treatment of the same. Under this heading would be included such drugs as arsenic and other agents which might of themselves give trouble. The following is recommended: (1) Have the patient anoint the body with liquid tar soap and follow with a warm bath. (2) Use

ammoniated mercury ointment locally for the lesions which are most troublesome. (3) Attempt to change the patient's attitude toward the disease. Try to get her to see that psoriasis will probably be with her the rest of her days, and she should not be seeking a cure in vain, but rather relief of symptoms. Dermatologists of large experience find that this is very helpful in bringing not only physical but also mental relief to the sufferers from this disease.

4. *Question*.—I have a single female patient, age eighteen, who has been having great trouble with dysmenorrhea, requiring injections of morphine at the beginning of each menstrual period, for the past two years. Her menses began at twelve years of age and are of the regular, four week interval type. They used to last two days, but now last three days. The pain comes on at the same time as the flow and is severe and cramp-like over the lower abdomen. It lasts about twenty-four hours, and is usually accompanied by vomiting. She passes no clots, but has a slight leukorrhea, lasting two or three days after menstruation. In December, 1929, she was given a general anesthetic, and dilation and curettage done, followed by the insertion of a glass stem pessary, which was left in five weeks. Bimanual examination at that time revealed no disease of the uterus or adnexa, and the uterus was normal in position. Following the use of a pessary, she had relief, but her trouble has recurred since the pessary was removed, but this does not seem to afford any relief. She has had no serious illness or injury, and her mother states that she herself never had any serious menstrual disturbance. Please advise further therapy.

Answer.—The following suggestions have been received for the treatment of your patient: (1) Physical exercise. Many young girls who come to training schools in hospitals with dysmenorrhea seem to respond very well to physical activity. Gymnasium work is often prescribed for patients of this type, especially if they are lethargic and underdeveloped and undernourished. (2) Displacement. You have already stated that there is no displacement of the uterus, so that correction is not indicated. (3) Attempt to determine if the dysmenorrhea is of the spasmodic type. It is necessary to test the type of dysmenorrhea by giving atropine in good sized doses. Several fairly large doses should be given at the onset of menstruation; and if the pain is of the spasmodic type, it will probably give relief. (4) Benzyl succinate is commonly used. This is a soluble preparation and may be given in water, five grains every half hour up to twenty-five grains. It should be started as soon as the patient believes that she is going to menstruate. (5) Hot douches, hot sitz baths, and applications of heat are often helpful. (6) Psychic factors. This is often present, and an attempt should be made to correct the patient's attitude toward her complaint.

OF GENERAL INTEREST

Dr. Hilding C. Anderson of Duluth has announced the changing of his name to Anderson C. Hilding.

The death of John Bessen, father of Dr. William A. Bessen of Minneapolis, occurred in March, 1930.

Mrs. Knut Haegh, wife of Dr. Knut Haegh whose death occurred in 1925, died at her home in Minneapolis, in March.

Dr. C. B. Wright is to speak before the Georgia Medical Society at their annual meeting at Augusta on May 14. He is also to address a public health meeting.

Dr. E. E. Zemke, who has finished his hospital year in St. Mary's Hospital, Duluth, will locate in Fairmont, where he will be associated with Drs. F. N. and R. C. Hunt.

Col. Kent Nelson, director of the University of Minnesota medical unit of the reserve officers' training corps, will leave the university at the end of the school year, it has been announced.

Dr. Phoebe Pearsall-Block, who returned to Moline, Illinois, last July after five years' residence in Virginia, Minnesota, was elected president of the Moline Physicians' Club at the annual meeting held March 7, 1930.

Drs. F. H. Stangl, P. E. Stangl, C. B. Lewis and W. L. Freeman, who have been practicing under the names of Drs. F. H. and P. E. Stangl and Lewis Clinic at St. Cloud, Minnesota, joined their resources April 7, 1930, and will practice in the future under the name of Lewis-Stangl Clinic, at 101 Seventh Avenue South, St. Cloud, Minnesota.

Max Mason, Ph.D., formerly president of the University of Chicago, was elected president of the Rockefeller Foundation, to succeed George E. Vincent, Ph.D., who retired January 1, 1930. Dr. Mason was assistant professor of mathematics at Yale from 1904 to 1908 and professor of mathematical physics at the University of Wisconsin from 1908 to 1925.

Phyllis Jeannette Kay of Little Falls, Minnesota, has been selected as the state winner in the second annual Gorgas Memorial Essay Contest. The subject this year was "The Gorgas Memorial, Its Relation to Personal Health and the Periodic Health Examination" and the national winner to be chosen in May from the selected winners in each state will receive the \$500 cash prize offered by Mr. Charles R. Walgreen, of Chicago, of drug store fame.

After nine years of preliminary effort a Royal College of Physicians and Surgeons of Canada was established last November 20th. By an act of Parliament one hundred and forty-four professors of medicine, surgery, gynecology and obstetrics at the University of Toronto, McGill University, Laval University, the University of Montreal, the University of Manitoba, and the University of Alberta, were made charter members of the organization.

The American Hospital Association has designated May 12 as National Hospital Day. This particular day

was chosen because it is the birthday of Florence Nightingale, who is rightly credited with having done so much for the nursing profession and also in raising the standard of hospital service. The public is being urged to pay a visit to a hospital on this date to become better acquainted with the nature of the service the hospitals are providing.

Minnesota's birth rate for 1929 was the lowest in the history of the state, according to a recent report of the vital statistics division of the state board of health.

During the year there were 46,502 births, a rate of 17.08 per 1,000. Since 1915, when the rate was 24.6 per 1,000 persons, there has been a steady decline in the birth rate. The statistics showed that the greatest number of births occurred during March, with 4,298. The death rate for the year also was one of the lowest on record, totaling 25,677, or 9.4 per 1,000 persons. Only in 1927, when the rate was 9.2 per 1,000, has the figure been bettered.

STATE ASSOCIATION NEWS

The series of Colloquium lectures offered by the Committee on Hospital and Medical Education is proving decidedly popular this year. Willmar, Brainerd and Winona booked the course within 48 hours. Faribault, Litchfield and Owatonna made immediate inquiries.

Only five courses are to be given this spring, though more will be offered in the fall if possible, the committee announces. At least twenty medical men are asked to enroll for each.

The course includes eight programs spread over a period of eight weeks. Tuberculosis, cancer, obstetrics, hospitals, heart disease, immunology and public health are among the subjects scheduled for lecture and demonstration. The committee is to be congratulated on having secured five of these events without cost to those who book them.

President S. H. Boyer, E. A. Meyerding, Herman Johnson, and C. B. Wright, executive officers of the state association, will go to Marshalltown, Iowa, to address the annual meeting of the Iowa State Medical Association, May 14. On the way they will attend a special meeting of the Mower County Medical Society to be held at Austin, May 13.

N. O. Pearce, Minneapolis, addressed the Rice County Medical Society at Faribault, April 23, on "Pediatrics."

Bulletins were sent by the Educational Committee of the state association to Minnesota newspapers during the past month on the following subjects: "Heart," "Carbuncle," "Arthritis," "Eyestrain and the Movies," and "Tuberculosis." The last was designed to coincide and coöperate with the regular April diagnosis campaign carried on by the National Tuberculosis and the Minnesota Public Health Associations.

George Earl, chairman of the Committee on Public Health Education, spoke before the St. Cloud Stearns-Benton County Medical Society at St. Cloud, April 17.

There is no statutory provision in the laws of Minnesota compelling a physician or hospital to keep x-ray films for any definite length of time. Such is the finding of F. Manley Brist, attorney for the State Board

of Medical Examiners, who has made an exhaustive search of the laws of the state following a discussion of the matter at the Secretaries' Conference in St. Paul.

It is Mr. Brist's opinion, however, expressed in a letter on the subject received at state association headquarters, that all films, plates and like records be kept for a period of two years, at least, from the date of the work.

In the Minnesota statutes of 1927 covering malpractice suits, such suits must be commenced within two years, Mr. Brist points out, with this exception—that the statute does not exclude suits by persons under 21 years of age even after the two-year limit, until such persons have attained their majority.

Dr. F. E. Harrington, Commissioner of Health of Minneapolis, is directing the third annual campaign for the prevention of tuberculosis in Hennepin County. Nationally observed by tuberculosis associations throughout the country during the month of April, the local program of education in the prevention of the white plague will take place April 21 to May 1. Because of his connection with Lymanhurst, America's first school of its kind for tuberculous children, and his activity on committees of the National Tuberculosis Association, Dr. Harrington is especially qualified for leadership in the campaign which will reach into every home in the county, focusing public attention on the importance of early diagnosis of the childhood type of tuberculosis.

THE PRACTITIONER AND THE MEDICAL SOCIETY LIBRARY

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sicians who have little leisure time. Much routine work, which could be done better by some one specially trained to do it, is undertaken by physicians who know little about it. In too many cases, physicians who would not think of compounding prescriptions or of repairing their surgical instruments, load themselves with business details of book ordering, bibliography, abstracting and the like, which a good librarian could do as well or better in much less time and at less expense. This is true in even greater measure of the individual library work of the physician. His time can be saved in large measure by a good medical librarian. If she cannot do it, either she is not a good librarian or the work requested involves difficulties not previously suspected or anticipated. Exploration is often as necessary in medical work as in surgery and it sometimes reveals as unexpected complications.

The medical society library increases the possibility of securing the latest information on any medical subject because it represents or should represent the varied interests of the society it serves. Modern diagnosis is considered more accurate because it represents the combined or compromise opinions of several qualified experts, each looking at many of the same phenomena

from different angles and discovering new symptoms. It is logical to expect also that the reports of study in different fields, of conditions much the same but with differing relations, should lead to more exact appraisal of phenomena in any or all of these fields. In other words, really significant data are much less likely to be overlooked by the many than by the individual.

The probability that really worthwhile material on the subject in question will be available is greatly increased when such material is selected by a variety of experts and, when acquired for the library, subjected to criticism by the other experts who use it. Every one using the library may partake of the advantages arising from such critical appraisal. He is in consultation, through the books and periodicals, with his colleagues who have already consulted them.

In many cases, the medical society library of moderate size is of greater direct value in practice than the larger medical school or great metropolitan society library which is used also for purposes of research. It must be selected with more discrimination because there is less money behind it. Practice must depend on research, but practice is not primarily research. The obscure symptom may often be interpreted only by a post-mortem and a series of later laboratory tests. This truth does not overcome the natural objection of most patients to advance science by personally furnishing post-mortem material. The reputation of the university professor may properly be based on lengthy laboratory studies and protracted analysis, but the professional and financial success of the practicing specialist is not based on similar methods. He seldom has time for lengthy study on a serious case. He must and does study the result of others' work as they report it.

The monograph which codifies the best average practice is often more serviceable to him than the promising but inconclusive experiment which he uses mostly when favorable conditions permit experiment or when desperate conditions suggest it as a last resort. The medical periodicals which the medical society library takes and keeps should also be chiefly those which stress the applications of medical theory or biological research. The practitioner, therefore, will often find in his own society library a collection of greatest value.

In communities like Minneapolis and St. Paul, there is a very definite place for the medical society library. It supplements the personal office library and reduces the necessary expenditure for it. In most cases, the society library will be adequate for the immediate needs of average practice. Where it is not, or where the specialist desires to pursue his research further, the large and rapidly growing biological-medical collection of the University of Minnesota is at his service, for almost unrestricted reference use within the library building. Private office, medical consultation and clinic or hospital (or both) are successive stages in medical efficiency. Private office reference collection, medical society library and large medical school or university reference library should be no less recognized as similar opportunities for medical and surgical effectiveness.—Frank K. Walter in Bulletin, Hennepin County Medical Society, Vol. 1, No. 5.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of March 12, 1930

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, March 12, 1930. Dinner was served at 7 P. M. and the meeting was called to order at 8 P. M. by the President, Dr. Emil S. Geist. There were 50 members and 1 guest present.

Minutes of the February meeting were read and approved.

The Secretary read the report of the Executive Committee meeting held earlier in the evening. This was approved.

The scientific program of the evening consisted of a paper and two theses, as follows:

DR. WILLIAM F. BRAASCH (Rochester) read a paper on "Congenital Failure of Renal Rotation and Associated Anomalies" and showed numerous lantern slides of these anomalies.

DISCUSSION

DR. CAMPBELL BEGG (Wellington, N. Z.) (by invitation): Mr. President and Members of the Minnesota Academy of Medicine: I have to thank you very much for your welcome this evening. I feel it a great privilege that, thanks to the courtesy of Dr. Braasch, I am able to be present at one of your meetings. St. Paul and Minneapolis are well known to me through the preëminent men they have produced in various spheres of medicine. I also appreciated very much Dr. Braasch's masterly presentation of this subject. When pyelography is mentioned throughout the world, his name is certainly the one uppermost in all minds as the one who established the procedure on a practical basis.

The discussion of such a paper on short notice is not easy. The subject is most important from the point of view of the general surgeon as well as the urologist. Some of the bizarre shadows shown tonight are reminiscent of a zoölogical garden. The figures of many familiar animals can be seen in these shadows. I always picture the pyelogram of the non-rotated pelvis by comparing with a kangaroo. It can appropriately be called the "kangaroo" pelvis, the tail being the ureter. To work out theories of the formation of the anomalies of the urinary tract on the accepted developmental facts is rather an interesting pursuit, but when we find the axioms wrong the whole ingenious theory is apt to crumble. I remember in a paper working out the method by which aberrant ureters are produced by the assumption of the usual idea that the ureter comes as a bud of the Wolffian duct which forms the trigone and posterior urethra. Unfortunately and much to my annoyance, I read an article last year by a German writer contending that the Wolffian duct did not do this at all!

It is very difficult to analyze the factors that make the kidneys in their ascent adopt one position or the other. We might assume the slope of the psoas muscles as one of the factors of rotation, but when Dr.

Braasch has shown that many of these non-rotated organs still retain fetal lobulation, it almost makes one think that a definite urge is present in the kidney itself. Immaturity in constitution leads to abnormality in position.

I see, however, no reason why kidneys retained in the pelvis should not come to lie on their side. The room in the pelvis is needed for other purposes and the kidneys are pushed by pressure into the position where they will take up least room, i.e., on their sides—sometimes on one, sometimes on the other.

There is a type of fully-developed kidney which appears normal in the pyelogram and in which the pelvis lies in front of the vessels. This, incidentally, is one of the criteria by which to decide whether the displacement is by acquired torsion or is congenital. In torsion the relation of the vessels to the pelvis remains normal. Many years ago Dr. Charles Mayo advocated exposing the kidney pelvis from behind to remove a stone from it, and then to cut boldly down on the stone through the fat and other tissues without dissecting out the pelvic wall. The idea was to prevent fistula. Once when about to carry out this technic, I looked more closely at the structures and found that the pelvis was in front of the vessels, so that a bold incision from behind would have traversed the renal vessels before reaching the stone.

Abnormal renal arteries are the rule rather than the exception. On one occasion I encountered a pyelectasis caused, or at least accentuated, by an aberrant renal artery which was almost the sole supply of the kidney. It entered the lower pole. As I could not cut the artery without destroying the kidney, I cut the dilated pelvis right across the ureter and the lower section of the pelvis below the artery and brought it up on the other side. The result seemed to be satisfactory.

I should like again to say how great a pleasure it has been to be here tonight, to have heard such an excellent paper, and to have had the opportunity of meeting you all.

DR. F. E. B. FOLEY (St. Paul): I have been delighted with Dr. Braasch's presentation, and greatly instructed, but simply astounded by the amount of his material shown in the lantern slides. Such an array of anomalies is remarkable.

The importance of anomalies of the upper urinary tract as a subject of clinical urology is not generally appreciated. On a summary analysis of our own material it is found that, if cleavage anomalies (duplications) are included, these conditions are even more frequent than renal tuberculosis.

A good grounding in the pathology of urinary tract disease, of course, is essential in clinical urology. Knowledge of upper urinary tract embryology is likewise essential in clinical problems in which renal anomaly is concerned. That such anomalies are so frequent emphasizes the importance of at least a working knowledge of this embryology. If one is to have much to do with diagnostic and surgical urology, this is of great importance, and only by understanding the morphogenesis of these anomalies may findings indicating their presence be properly interpreted.

Dr. Braasch, in spite of my efforts, still refers to anomalies of Form, Position and Number. This old classification is arbitrary and does not take into account facts of development. Some time ago I submitted a new classification based on the morphogenesis of these malformations. According to this, anomalies of the upper urinary tract are divided into three groups according to the primitive organ from which the malformed structure derived: (1) The Renal Blastema (kidney proper). (2) The Wolffian Duct (ureter, pelvis, calices, excreting ducts). (3) The Vascular Channels (renal blood vessels).

In the first group belong the anomalies of form, such as lobulated kidney, polycystic kidney and the fusion malformations such as horseshoe kidney, unilateral fused kidney and malpositions such as ectopia and malrotation of the sort described by Dr. Braasch.

In the second group belong the cleavage anomalies, usually referred to as duplications, complete or partial. Abnormal position of the ureteral opening within the bladder, urethra, genital tract or rectum also falls into this second group. It includes also those structural narrowings of the excretory channels occurring as congenital strictures of the ureter, uretero-pelvic junction or calices. The third group is comprised of anomalies of the renal vascularization.

Dr. Braasch enthusiastically approved of this classification when it was first presented.

There is one point in regard to the interpretation of pyelograms showing under rotation of the kidney which Dr. Braasch did not mention, but one which is of great aid in recognizing the exact condition present. Whether or not attention has been called to it by others, I do not know. As indicated by Dr. Braasch, there may be malrotation either alone or in conjunction with fusion. It is of great importance to differentiate between the two. Even with a pyelogram on only one side, the differentiation may usually be made by the presence or absence of what I have called the normal "axial deflection of the kidney." When the kidney is first formed down near the lower end of the Wolffian duct and during the early part of its ascent, its axis is oblique from above toward the midline below. During the latter part of ascent this axis is deflected and becomes oblique, from below toward the midline, above. With simple under rotation this normal axial deflection is present. Fusion of the two kidneys prevents this occurrence and axial deflection is absent. Thus the presence or absence of normal axial deflection is a criterion for differentiating between simple under rotation and fusion anomaly.

DR. R. E. SCAMMON (Minneapolis): I don't know that I can add much to the discussion. Problems of this kind interest the embryologist very much and we all appreciate their being brought to our attention. When one considers the number of things that take place in the development of the kidney, it is not surprising that we find these anomalies. Most anomalies consist either of structural defects, occasionally growth anomalies, or of perversions of position. The kidney is one of the organs which may have all of these developmental defects. The kidney is also peculiar in the

respect that these anomalies occur much later than is usual, i.e., between about the fourth week and, perhaps, the sixth week after conception. These anomalies of the kidney are, most of them, a good deal later—a matter of later embryonic period or extending into fetal life.

So far as I know, we find deflections or rotations of major importance in the body in the following places: in the heart, in the gastro-intestinal tract, in the utero-vaginal canal, and this one just pointed out in the kidney. These are the main places where we find a deflection by axis rotation. It seems to me we know very little about these deflections in the axes of organs or systems. The mechanism of heart rotation seems to fit fairly well with certain known principles of hydrostatics. The anomalies that we find in the uterovaginal system seem to occur very much later and are probably tied up with the rapid growth of the pelvic colon and certain other pelvic viscera. But we know much less of these anomalies of axial positions of the gastro-intestinal tract and the kidneys and ureters. Some work done by Cary indicates that rotation of the gastrointestinal tract is probably an interstitial matter; that it is not due to mechanical pressure but to the fact that the cells of the tract grow in very definite zones. Why this is so, we do not know. It seems quite probable that this unequal growth is responsible for the rotation of the digestive tract. I am inclined to think that if we had an analysis of this kind for the kidney and ureter, we might find the same thing to be true.

The secondary changes that we get in fetal life do not seem to be tied up with pressure. I am inclined to think that these very interesting anomalies will be found to be tied up with the rates of growth in certain zones; that some parts of the tract have marked powers of growth and some practically stand still. I would suggest that this is probably where we are going to find the explanation for these interesting anomalies; that it is in some growth phenomenon rather than in some mechanical phenomenon that we will find the true cause of these modifications in development.

DR. ARNOLD SCHWYZER (St. Paul): It just occurred to me (while listening to Dr. Foley's remarks) whether it could not be that this inward rotation of the upper pole, while the kidney gradually ascends, is due to the pivoting around the origin of the renal artery. The renal artery with its different branches holds the kidney while it ascends, so that, when the kidney comes up, the artery with its branches would rotate the pole. Perhaps the blood waves through the branches have a mechanical action to steady the distance of the poles from the main artery. I wonder whether there would be anything to that view.

DR. WILLIAM F. BRAASCH: I am certainly very grateful for the generous discussion of my paper. In answer to the last suggestion made by Dr. Schwyzer, one man's theory is probably as good as another's and that appeals to me as a very plausible one. In reply to Dr. Foley, I will say that I still think his classification is a good one and I tried to use it in this paper, but found this was so broad that I could not, and had

to go back to the old form. I hope this paper may have aroused some interest in this rather unusual field.

DR. CHARLES N. SPRATT (Minneapolis) read his thesis entitled "A Review of 100 Cases of Intraocular Foreign Bodies." Lantern slides and various instruments were shown.

DR. SPRATT: At this time it is proper and right that I should acknowledge my appreciation of election to this ancient and honorable body. In February I completed 25 years in the practice of medicine in this city and this comes as a sort of consummation of that event. In that 25 years I have seen 22,400 patients, two-thirds of them eye patients. Among the latter were 98 individuals who had intraocular foreign bodies; 3 had foreign bodies in both eyes, making 101 cases of intraocular foreign bodies.

DISCUSSION

DR. JOHN F. FULTON (St. Paul): I rise more for the purpose of congratulating the Academy on having Dr. Spratt as one of its members and to bid him a joyful welcome rather than to take part in the discussion of his paper. The contribution which he has given us is a very valuable one, as much so as any ophthalmologist that ever contributed to the Academy. I shall not enter into the history of methods of treatment of intraocular foreign bodies but refer you to a very excellent and reliable paper by Walter V. Moore, of Brooklyn, published in the 1924 volume of the American Journal of Ophthalmology in which he gives credit to Dr. Nikolaus Meyer as being the first to extract steel from the eye with a magnet. He quotes from the original paper by the author in which he says that he succeeded in removing a needle-shaped piece of steel after having failed to remove it by means of the usual instruments, saying that he combated the subsequent inflammation by the use of leeches and cold packs. The two great leaders who developed and popularized the use of the magnet for removing foreign bodies from the eye were Julius Hirschberg, of Berlin, and Haab, of Zurich. Hirschberg became dissatisfied with the fixed magnet as being clumsy and inconvenient so he invented the electromagnet, removing foreign bodies by opening the vitreous chamber when situated in that part of the eye. We are using about the same magnet today with the addition of greater power as demonstrated by the Sweet magnet. Dr. Haab, not being satisfied with the magnets in use, invented his giant magnet which he demonstrated at the Ophthalmological Congress in Heidelberg in 1902. His idea was to add power to the instrument, believing that the greater the power the better the chances for success. He strongly recommended always to remove the foreign body through the route that it entered, opposing posterior sclerotomy.

A few years ago it occurred to Dr. Jackson that the magnet could only remove foreign bodies when it was able to overcome the grip of the ocular tissues and he maintained that it was just as important to loosen this grip as to increase the power of the instrument; so he suggested the use of the electromagnet scissors for this purpose, and succeeded in obtaining excellent results in this way when the magnet itself failed.

Only a few reports such as Dr. Spratt has given us tonight have been published. Haab reported 165 cases; failed in 25 of this number; and succeeded in removing the foreign body from 141. He enucleated 39. Cataract developed in 71, extraction of which produced excellent results in 51. Fisher, of Chicago, reported 150 cases, in 4 of which steel was found in the eyeball after enucleation. He obtained good results in 96 of these cases. The excellent results obtained by the reports here briefly analyzed, together with the very excellent analysis made by Dr. Spratt this evening, indicate the most gratifying results obtainable by the magnet. This is all the more wonderful when I remember that before its invention the very best oculists claimed that a foreign body in the vitreous chamber demanded enucleation. Criedland recently reported 76 cases, of which 43 were saved and 33 enucleated. His results demonstrated that the more anterior the foreign body was located the better the results. Twelve of his cases developed cataracts, 10 of which were successfully removed with complete restoration of sight. He always waited until the opacification was complete before extraction. Clinical experience demonstrates that the lens is more tolerant to foreign bodies than any other part of the eye. I refer you to a paper by Dr. Nikolaus Blatt, of Transylvania, published in the February number of the American Journal of Ophthalmology, in which he carefully points out the importance of conservatism in treating foreign bodies located in the lens.

DR. FRANK BURCH (St. Paul): We have much enjoyed this presentation by the essayist. One point learned from experience is concerning the presence of a foreign body in so-called idiopathic iritis. In 6 instances which I can recall, an apparently idiopathic iritis was found to have been caused by an intraocular foreign body. Only by a careful history of what transpired preceding the iritis can the possibility of a retained foreign body be disclosed. Two of my cases were in children, and in each instance what might have been a serious affair, as regards the future of the eyes involved, was prevented by the discovery of a foreign body within the eye, in one instance with the aid of the x-rays. In one case of a man who had developed an extremely persistent iritis with hypopyon, the condition was treated for three weeks with careful study for focal and systemic infection, until a more careful inquiry revealed the fact that three weeks preceding the onset of inflammation he had been hammering a plowshare and had felt something strike his eye with only temporary irritation. He had not associated the late inflammation with the previous injury.

In two other instances the patients could not even remember having received any injury although in one case the ophthalmoscope, and in the other the x-ray, revealed the presence of a foreign body in the choroid. The history of every patient with iritis should be carefully taken to cover such contingency.

The tolerance of the eye for metallic as well as non-metallic foreign bodies is at times very surprising. In one instance a piece of glass penetrated the eye following a laboratory explosion and was retained about three

years until it was successfully removed with preservation of vision. Twice during the past few years encysted cilia have been removed after entering the eye through incised wounds of the cornea. A few weeks ago my associate removed a piece of steel from the lens of an eye which had remained there for about a year and had developed cataract, but at no time was there any severe reaction in the eye. Copper is peculiarly prone to cause disturbance. I have in the hospital at this time, a patient with copper retained within the eye in whom I have successfully removed a cataract without any inflammatory reaction. I believe he will eventually develop iridocyclitis as copper produces chemical changes which seem to be extremely irritating. Copper will produce a leukocytic pus within the eye without actual infection. In 8 or 9 shot cases which I have seen there has never been a case of sympathetic ophthalmia. In fact, I have never personally seen but one case of sympathetic ophthalmia following retained foreign body.

Dr. Spratt mentioned a subject which I would like to discuss further, namely, the fallibility of the x-ray localization. Once in my experience the x-ray examination did not reveal a foreign body; in another the triangulation showed the foreign body to be outside the globe. In both instances siderosis subsequently developed and in one of the patients enucleation was necessary. As Dr. Spratt mentioned, repeated x-ray examinations should be made, when necessary, if the history indicates the possibility of a foreign body. Also I know of cases where foreign bodies have been reported which could not be removed with a magnet. The eyes were removed and the foreign body was found embedded in the sclera in a harmless position. The difference of 0.5 mm. in triangulation measurements is sometimes a very important matter.

A hopeful phase of this subject is the fact that fewer foreign bodies in the vitreous are being seen because more men are wearing goggles in their work, and the use of non-shatterable glass in goggles affords added protection. Unfortunately most of the accidents we see are in garages or in industrial plants where these precautions are not observed. I believe in some states the Industrial Commissions insist on the observance of all precautionary measures, including goggles, if the employees are to receive compensation for external or for intraocular foreign-body injuries.

DR. JOHN BROWN (St. Paul): One thing has appealed to me which I do not know whether or not Dr. Spratt has thought of, and that is the tolerance, or intolerance, for foreign bodies for the individual in the eye itself. There is something inherent in the individual himself which makes this tolerance to a foreign body, when another one would not tolerate it at all, and whose eye may go on from bad to worse before the patient arrived at the oculist's. In my experience the young individual is much more prone to these disturbances than the adult. I presume the lens structure has more resistance in adults. In many instances you will have loss of the lens substance if the foreign body pricked the lens and many go on to cataract. I am beginning to feel that an adult with

a foreign body in the eye is a much better risk than is the juvenile.

DR. SPRATT (in closing): This subject, of course, is so interesting to ophthalmologists, that we could talk all night. Each case is a story in itself. I have seen two cases with cilia in the eye and left them alone. They are not included in this series. There were two or three in this series that did not know they had a foreign body in the eye. One boy was hanging around a blacksmith shop, and later developed pink-eye, which, however, proved to be an intraocular foreign body. The important points of the whole subject are these: (1) Is the foreign body clean or dirty? (2) Whether it is clean or dirty, the accurate localization is absolutely essential if you are going to treat it properly. If it is back of the eye, leave it alone.

DR. FULTON: Did any of those patients have glass in the eye?

DR. SPRATT: There was no glass; four of them had pieces of granite.

DR. T. A. PEPPARD (Minneapolis) read his Thesis on "Pericarditis" and showed lantern slides.

The meeting adjourned.

R. T. LA VAKE, M.D., Secretary.

TRANSACTIONS OF MINNEAPOLIS SURGICAL SOCIETY

Meeting of April 3, 1930

The monthly scientific meeting of the Minneapolis Surgical Society was held in the Lounge of the Hennepin County Medical Society April 3 at 8 P. M. with the president Dr. S. R. Maxeiner presiding.

Dr. Martin Nordland presented a paper on "The Larynx—Its Relation to Thyroid Surgery." This showed much original work in the way of anatomical dissection as well as conclusions drawn from his wide surgical experience. This paper has been accepted for publication in the *Journal of Surgery, Gynecology and Obstetrics* and will appear in a future issue of that journal.

The discussion of Dr. Nordland's paper was opened by Drs. Fowler and Hanson.

DISCUSSION

DR. L. HAYNES FOWLER: I first became particularly interested in the anatomy of the superior laryngeal nerve several years ago when Dr. William A. Hanson and I dissected over two hundred thyroid glands, the results of which were reported in a paper read before this society in October, 1928, and published in *Surgery, Gynecology and Obstetrics* July, 1929. In that work our efforts were directed especially toward establishing more accurate information regarding the relations of the recurrent or inferior laryngeal nerve. However, we did at that time note the very close relation between the superior laryngeal nerve and the upper pole of the thyroid gland and expressed the opinion that injury to this nerve might be the cause of some of our post-operative vocal disturbances.

This is demonstrated by the results of the work which Dr. Nordland has given us to-night. He has shown very clearly the close relation of the internal branch of the superior laryngeal nerve to the upper pole of the thyroid gland, and secondly has demonstrated that this nerve supplies motor fibers to the interarytenoid muscle, instead of being a purely sensory nerve to the larynx.

To me this means therefore that we can no longer handle the superior pole of the thyroid gland with impunity but that we shall have to consider the branches of the superior laryngeal nerve as well as those of the recurrent laryngeal nerve a real source of danger in thyroidectomy and govern our operative technic accordingly.

DR. WILLIAM A. HANSON: We are much interested in this anatomical and physiological report regarding the external laryngeal nerve, a branch of the superior laryngeal nerve. This nerve, as we found it, passes obliquely downward and medially, crossing posterior to the internal and external carotid arteries and between the upper pole of the thyroid and the lamina of the thyroid cartilage, and innervates the cricothyroid muscle. Here we have a close relation to the superior thyroid arteries.

The physiology of the nerve is not definitely known. Experimental work by cutting this nerve has been done in dogs but no effects on the vocal cords were produced.

We called attention to this nerve in our report on the surgical anatomy of the thyroid gland with special reference to the relation of the recurrent laryngeal nerve which we presented before this Society in October, 1929, starting a further investigation of the nerve in order to determine whether or not we are overlooking a definite anatomical structure, injury to which may be causing some post-operative vocal disturbances, and shall be interested to know what conclusions Dr. Nordland finds in his problem regarding the physiology of the external laryngeal nerve.

In 262 of our 400 cases, or 65%, the nerve passed posterior to main branches of the inferior thyroid artery, and in 104 of 400 cases, or 26 per cent, it passed anterior to the main branches of the inferior thyroid artery. In 34 cases, or 8.5 per cent, it passed between the main branches of the inferior thyroid artery.

Dr. E. K. Green presented a case report of an unusual case of acute intestinal obstruction.

A CASE OF ACUTE INTESTINAL OBSTRUCTION

DR. E. K. GREEN: The following is the report of a case of acute intestinal obstruction in a girl twelve years of age resulting from a chronic intussusception which gave irregular symptoms for about two weeks.

There was no history of previous attacks except when she was about six years of age her mother said she had had a stomach upset which lasted four or five days.

She was first seen in this attack November 3, 1929, at which time she had a little nausea and slight abdominal pain. Between then and Nov. 12, 1929, she was seen twice and at no time was there any definite signs of impending danger. Her symptoms were those

of nausea, irregular pain, diarrhea at times, and again was entirely free from symptoms to such an extent that she had a party for some of her friends. Her mother was a Christian Scientist and consequently minimized her symptoms and gave very little coöperation. On November 14, 1929, after about twenty-four hours of severe come-and-go pains with nausea, some vomiting and obstipation, she presented a very different picture. She was very definitely dehydrated and her abdomen was distended. Her pulse was 130 or more. Dr. C. W. Pettit, who had been in charge of the case, then made a very positive diagnosis of acute obstruction and sent her to the hospital for immediate operation.

My reason for reporting this case is to show how, in desperate cases, with conservative methods and careful management, we are able to get by and obtain a final recovery.

At the first operation we found about twelve or fifteen inches of terminal ileum intussuscepted into itself forming a tumor nearly the size of the fist, which was held by light adhesions in the pelvis. On lifting it out, we found about 1.5 inches of collapsed ileum proximal to the ileocecal valve and a Meckel's diverticulum just proximal to the tumor. The proximal ileum was greatly distended, thickened and filled with a semi-liquid which was impossible to remove with a sucker. In our efforts to untangle the intussusception, we found the bowel ulcerated through, making it impossible to prevent the escape of feces. Because of her desperate condition, we stitched the gut to the wound and drained the proximal loop.

By way of management, when she came to the hospital, while setting up the operating room, we gave her 1,000 c.c. of normal saline under the skin. As soon as she was returned to her room, after the operation, we gave her 1,000 c.c. of 3 per cent salt and 1,000 c.c. of normal saline. She took, in addition, 2,000 c.c. by mouth during the first twenty-four hours. She weighed only about 60 pounds and with 5,000 c.c. of water within twenty-four hours, she reacted very nicely. During the next eighteen days our only effort was to get her in shape for the ultimate removal of the tumor and anastomosis of the gut. Once we took her to the operating room to untangle the intussusception to relieve her of constant pain and discomfort. We made an effort to close the gut at that time, but it soon ulcerated through.

As we were about to do the final operation, we were delayed for a few days because of a bowel upset in which she had numerous watery irritating stools. On December 2, 1929, we did the final operation which consisted in removing the gut in the intussusception with its mesentery and uniting the cut ends. Because of the short distal loop of the ileum, I used a Murphy button for the anastomosis and to our surprise the abdominal wound united by first intention and there were no signs at any time of either local or general peritonitis. The patient passed the button on the seventh day and aside from mild symptoms of obstruction for about twelve hours, two days later, she made an uncomplicated recovery.

The discussion of Dr. Green's case report was opened by Dr. Owen Wangenstein.

DISCUSSION

DR. OWEN H. WANGENSTEEN: Dr. Green's case is interesting from several standpoints. Intussusception occurs most frequently between the fifth and ninth months of life. About 75 per cent of bowel invagination occurs during the first two years of life. Its occurrence in male infants is three times more frequent than in females. After the age of three, intussusception is relatively infrequent and an inciting agent in the nature of Meckel's diverticulum or a tumor in the bowel is frequently present. In patients suffering from intussusception who have passed the age during which telescoping of the bowel is common, such a predisposing mechanism as was present in Dr. Green's case is to be suspected. Eliot and Corcasden in a review of 300 cases of intussusception in adolescents and adults found a tumor or a Meckel's diverticulum to be present in one-third of the cases. Benign tumors are more frequent offenders than malignant neoplasms and the small intestine more often concerned than is the colon in cases of intussusception at this time of life. Chronic or recurrent intussusception is more prone to occur in adolescents and adults and a tumor of the bowel is not an unusual finding in such cases.

In irreducible intussusceptions of the type presented by Dr. Green, excision with primary anastomosis or exteriorization are the Surgeon's only alternative. In a poor risk, Dr. Green's choice of exteriorization carries the lesser risk. The performance of an intestinal anastomosis in the presence of an acutely distended intestine is a hazardous undertaking and is to be religiously avoided. If the temporary fistula in the bowel proves to be high, the content discharged from the proximal loop is to be collected and poured into the distal through a urethral catheter. A patient can be tidied through a crisis by this compromise and an intestinal anastomosis more safely made at a later date.

Infants with intussusception stand intestinal resection very badly and a non-viable segment in such a patient is synonymous with an extremely bad prognosis. In 1913, Dowd could find but eight cases under one year of age that had survived intestinal resection for bowel invagination.

In an invaginated bowel in which the intussusception is viable but not reducible, a manœuvre suggested by H. P. Brown of Philadelphia in 1926 appears to be especially meritorious; calling attention to the fact that the edematous neck of the intussusciens or ensheathing layer prevents the reduction of the apex of the intussusception, he cuts the cuff of the ensheathing layer with scissors which permits of prompt reduction. The resulting linear incision is then closed with Lembert sutures.

Almost universally in our textbooks of surgery, operative reduction is extolled as the only safe method of dealing with intussusception. Recently, however, Hipsley of Sydney, Australia, who to date can boast a better result in the operative treatment of intussusception than any surgeon with whose reports I am familiar, has not only had success with the non-operative method but forcibly states that no surgeon should have recourse to surgery without giving the

non-operative method a trial. In the Medical Journal of Australia for 1918, Hipsley reports 51 consecutive successes with operation for intussusception in patients whose duration of symptoms was under thirty-six hours. Despite this admirable result, in a subsequent larger series reported in 1926 he finds the conservative method of reduction by water enemas at a gravity pressure of 3.5 feet to be successful in 62 per cent of instances.

Hirschsprung popularized the method many years ago at the Queen Louise Hospital in Copenhagen, but the method has never received universal approval. Hirschsprung as well as his successor, Monrad, employed chloroform anesthesia and combined enemas with manipulative taxis through the abdominal wall.

The advocates of the method limit the employment of this procedure, however, to colic types of bowel invagination alone; 75 per cent of intussusceptions being of the ileo-cecal variety (the caput caeci constituting the apex of the intussusceptum) the majority of instances are amenable to a non-operative attempt at reduction. Intussusception of the small intestine, viz., pure enteric types as the one reported by Dr. Green, and ileo-colic intussusceptions are not suitable. The "Achilles' heel" in Hirschsprung's method is that natural evacuation of the bowel has to be awaited to confirm a satisfactory and complete reduction, a decidedly unsafe criterion.

Pallin and Olsson of Key's Clinic in Stockholm have employed the hydrostatic pressure of a barium enema to accomplish the reduction in colonic types of intussusception as well as for immediate fluoroscopic control of complete reduction. During the past year at the University Hospital we have had an unusually large and interesting group of cases of intestinal obstruction and among them several cases of intussusception. We have employed this method with success and can endorse its use for colonic types of intussusception. The barium enema method not only shows the defect present but serves as an immediate control of adequate reduction. If the method fails, no harm has been done and resort can be had to operation without serious loss of time.

DR. STANLEY MAXEINER: There is one point that I should like to call attention to concerning the diagnosis of intestinal obstruction in general, viz., the unreliability of enemas as a diagnostic criterion of the existence of intestinal obstruction. There exists a general unwillingness to accept the diagnosis of intestinal obstruction as long as the patient expels an enema with the return of gas and feces. Recently, together with the aid of Mr. Goehl, a Senior Medical student, I established complete obstructions in dogs by cutting the small intestine across and inverting the ends. Invariably these dogs expelled gas following the administration of Noble's enemas. When a catheter was threaded into the distal segment and barium introduced, its transit through this distal bowel was accomplished in normal time. Dr. Herbert A. Carlson and I have since put balloons into the distal segments of dogs with complete obstructions and observed that the contractility of this bowel is much like the normal. The bowel

distal to the obstruction is physiologically as well as anatomically normal. Why shouldn't it expel gas following the administration of an enema?

In a complete low obstruction, enemas may continue to serve as a fairly reliable index of bowel obstruction, but in high obstructions as well as in partial obstructions it is a decidedly unsafe criterion. I do not deprecate their administration in suspected cases of bowel obstruction, but the interpretation of the data obtained by this means must be adjudged critically. It is a good plan to give such a patient two enemas. Unless the obstruction is low in the colon gas and feces will be returned with the first enema. If, however, no return of gas or feces is obtained with a second enema, administered half an hour after the expulsion of the first, evidence for the existence of an obstruction probably low down in the intestine is obtained. But the persistence of pain of an intermittent crampy nature, despite the return of enemas, is adequate indication for immediate operation.

The meeting adjourned at 10 P. M.

H. O. MCPHEETERS, *Secretary*.

OBITUARY

C. Eugene Riggs

(1853-1930)

Dr. C. Eugene Riggs, Saint Paul, the first physician in the Northwest to specialize in nervous and mental diseases, died at his home, April 3, 1930. The following record of his life was dictated by Dr. Riggs some six years ago:

"Dr. C. Eugene Riggs was born in West Unity, Ohio, in 1853. He belonged to an old and well-known Maryland family whose members played prominent parts in early American history. His early education was in the public schools of Bryan, Ohio. Entered Ohio Wesleyan University in 1873; received the degree of A.B. in 1877 and that of A.M. three years later. Studied medicine in the office of his brother, Dr. J. U. Riggs of Bryan, for two years, in the good old-fashioned way. After this had one year in Medical College at Nashville, Tenn. Graduated in 1880 at the College of Physicians and Surgeons, Baltimore, Md. This was later merged in the Medical Department of the University of Maryland. Spent one year as senior interne at the Woman's Hospital, Baltimore.

"Came to St. Paul in the spring of 1881 and engaged in the general practice of medicine. The following year he was given the chair of neurology and psychiatry in the St. Paul Medical College, thus becoming the pioneer neurologist in the state of Minnesota, and when the Medical Department of the University of Minnesota was established he became professor of

nervous and mental diseases. This chair he held for 25 years and at the time of his death was professor emeritus.

"September 11, 1884, he married Mabel Elizabeth Pratt, daughter of Albert M. Pratt of Bryan, Ohio. They had one daughter, Mrs. Fred Winston Long of Jacksonville, Fla.

"For ten years preceding the establishment of the State Board of Control Dr. Riggs was chairman of the State Lunacy Commission. He made repeated trips abroad for the purpose of medical study, and on one such journey was authorized by Governor Merriam to investigate the insane hospitals of Europe for the purpose of reproducing in Minnesota whatever was of value in European methods of care for the insane. He was also the first to interest himself actively in the necessity for detention wards in our larger cities, in the need of special care for the criminal insane and in the imperative necessity for a voluntary commitment law. The propaganda thus started by Dr. Riggs ultimately brought about all these needed reforms in the state. He also was the first one to use the intraspinal medication in the West.

"Dr. Riggs was a member of the American Neurological Association, the American Psychiatric Association, Minnesota Academy of Medicine, Minnesota Neurological Society, the Ramsey County Medical Society and the Central Neuropsychiatric Association.

"He was also a member of the Society of Colonial Wars and of the Sons of the Revolution, of which he had been president, and of the Minnesota Club.

"Dr. Riggs was a member of Plymouth Congregational Church, Minneapolis.

"He was a member of Summit Lodge and a Past Master, also member of Osman Temple and Paladin Commandery, and was a thirty-second degree Mason."

He is survived by his daughter in Jacksonville, Fla., two grandchildren, Mary Winston and Charles Riggs Long, and his nephew, Dr. Charles Riggs Ball of St. Paul.

Aloysius Julius Kaufman

(1875-1930)

Dr. A. J. Kaufman, a practising physician of Franklin, Minnesota, where he had practised for the last seven years, died suddenly March 23, 1930, at his home of heart disease at the age of 55 years.

Dr. Kaufman was born in Passau, Bavaria, Germany, and received his early education there. In 1886, he came to Newark, N. J., where he attended a seminary and then entered the University of Pennsylvania Medical School, from which he graduated in 1899. He practised in Colorado, Portland, Oregon, and then at Cheyenne Wells, Colorado, where he had a hospital for ten years. In 1923, he came to Franklin, where he also had a hospital.

He is survived by his wife, and two daughters, Anna and Margaret Kaufmann.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

CANCER OF THE BREAST. William Crawford White, M.D., F.A.C.S., Junior Surgeon to the Roosevelt Hospital, Consulting Surgeon to the New York Nursery and Child's Hospital. 221 pages. Illus. Price \$3.00. New York: Harper & Brothers, 1930.

THE NORMAL DIET. W. D. Sansum, M.S., M.D., F.A.C.P., Director of the Potter Metabolic Clinic, Department of Metabolism, Santa Barbara Cottage Hospital. 3rd Ed. 134 pages. Illus. Price \$1.50. St. Louis: The C. V. Mosby Company, 1930.

GONORRHEA AND KINDRED INFECTIONS. George Robertson Livermore, M.D., F.A.C.S., Pro-

fessor of Urology, Medical Department, University of Tennessee, etc., and Edward Armin Schumann, A.B., M.D., F.A.C.S., Associate Professor of Obstetrics, University of Pennsylvania, etc. 257 pages; 66 illustrations. \$5.00. D. Appleton and Co., New York and London, 1929.

As the authors state, this rather short but practical work is a presentation of their personal experience and conclusions regarding the diagnosis and treatment of gonorrhea. Comparatively few references are made to the literature on the subject. Particular attention is paid to pathology. The various means of diagnosis are carefully described. Methods of treatment are covered briefly, with, in most cases, an indication of the preferences of the authors. Since there is a wide divergence of opinion as to the choice of methods, naturally the reviewer does not agree with the authors in some details. Still the methods advocated are based on sound reasoning and wide experience and must carry weight on that basis.

The arrangement of the subject matter is practical, and the table of contents and the index aid also in making this an especially valuable reference book in a practitioner's office.

T. H. SWEETSER, M.D.

WANTED—Salaried appointments for Class A Physicians in all branches of the medical profession. Let us put you in touch with the best man for your opening. Our nation-wide connections enable us to give superior service. Aznoe's National Physicians' Exchange, 30 North Michigan Ave., Chicago. Established 1896. Member The Chicago Association of Commerce.

WANTED—REPRESENTATIVES—Desirable territory open for qualified men to call on doctors, dentists and pharmacists; immediate and permanent work. Lea & Febiger, S. Washington Square, Philadelphia, Pa.

WANTED—Physician for locum tenens, six weeks, starting July 1, Southern Minnesota town, 1,000 population. Address D-68, care MINNESOTA MEDICINE.

WANTED—X-ray and laboratory position. Competent young lady with three years' experience in X-ray and routine laboratory work, desires position in doctor's office or community hospital. Two years' nurse's training. Some knowledge of physical therapy. Best of references. Address D-68, care MINNESOTA MEDICINE.

WANTED—Summer work as medical technician desired. Have had some experience. References given if desired. Margaret Sutermeister, 1121 Seventh St. S.E., Minneapolis, Minnesota.

FOR RENT—Best corner in city, occupied by doctors 40 years. Inquire J. E. Kinsella, Room 8, 601-5 St. Germain Street, St. Cloud, Minnesota.

POSITION WANTED in physician's office in or near Twin Cities by young woman physiotherapy technician. Can run urinalyses, make blood counts, also some x-ray. Eight years experience. Address D-65 care MINNESOTA MEDICINE.

SITUATION WANTED—X-Ray and laboratory technician, woman age 25, graduate of Swedish Hospital School of Technicians, Minneapolis. Have had three months experience in doctor's office. Can use typewriter. Address Box 222, Lamberton, Minnesota.

PHYSICIAN'S OFFICE FOR RENT—Best location Midway district, corner Thomas and Hamline. Rent \$25 a month. Inquire at dentist's office.

WANTED—Locum Tenens or assistantship by experienced physician, licensed in Minnesota. Address D-66, care MINNESOTA MEDICINE.

WANTED—Staff physician for Minnesota State Hospital. Either single or married man. Suitable accommodations for married man will be furnished with maintenance. Salary \$150 monthly. Address D-64, care MINNESOTA MEDICINE.

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ROSTER 1929

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| Counties—Dodge, Fillmore, Freeborn, Houston, Mower, Olmsted, Steele, Wabasha, Waseca, Winona. | |

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| L. SOGGE, M.D. | Windom |
| Counties—Cottonwood, Faribault, Jackson, Martin, Murray, Nobles, Pipestone, Rock, Watonwan. | |

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| Counties—Brown, Big Stone, Chippewa, Lac Qui Parle, Lincoln, Lyon, Pope, Redwood, Stevens, Swift, Yellow Medicine | |

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| F. A. DODGE, M.D. | Le Sueur |
| Counties—Blue Earth, Carver, LeSueur, McLeod, Nicollet, Renville, Scott, Sibley. | |

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| G. S. WATTAM, M.D. | Warren |
| Counties—Becker, Clay, Grant, Kittson, Lake of the Woods, Mahnomen, Marshall, Norman, Ottertail, Pennington, Polk, Red Lake, Roseau, Traverse, Wilkin. | |

DISTRICT NO. 9

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Minnesota State Medical Association

COUNTY SOCIETY ROSTER

BLUE EARTH COUNTY MEDICAL SOCIETY

Regular meetings, last Monday of month.

Annual meetings, last Monday of year.

President
Howard, M. I. Mankato

Secretary
Kemp, A. F. Mankato

Andrews, J. W. Mankato
Andrews, R. N. Mankato
Benham, E. W. Mankato
Black, Wm. Mankato
Bomberger, C. B. Mapleton
Butzer, J. A. Mankato
Cosgriff, J. A. Olivia

Dahl, G. A. Mankato
Denman, A. V. Mankato
Edwards, R. T. Elysian
Eckstein, A. W. Mankato
Franchere, F. W. Lake Crystal
Fugina, G. R. Mankato
Hielscher, Helen Hughes. Mankato
Hielscher, J. A. Mankato
Holbrook, J. S. Mankato
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Huffington, H. L. Mankato
Juliar, R. O. St. Clair
Kemp, A. F. Mankato

Koenigsberger, C. Mankato
Liedloff, A. G. Mankato
Lloyd, H. J. Mankato
Macbeth, J. L. St. Clair
Miller, V. I. Mankato
Osborne, L. Mankato
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Sohmer, A. E. Mankato
Stillwell, W. C. Mankato
Wentworth, A. J. Mankato

BLUE EARTH VALLEY MEDICAL SOCIETY

Faribault and Martin Counties,

Regular meetings, May-October

Annual meeting, October.

President
Logan, F. W. Blue Earth

Secretary
Hunt, R. C. Fairmont

Bailey, H. B. Ceylon
Blanchard, H. G. Fairmont
Boysen, H. E. Welcome
Butz, J. A. Monterey

Chambers, W. C. Blue Earth
Cooper, M. D. Winnebago
Durgin, F. L. Winnebago
Farrish, R. C. Sherburne
Gardner, V. H. Fairmont
Heimark, J. J. Fairmont
Henderson, A. J. Kiester
Hunt, F. N. Fairmont
Hunt, R. C. Fairmont
Hunte, A. F. Truman

Jacobs, A. C. Elmore
Johnson, H. P. Fairmont
Logan, F. W. Blue Earth
Luedtke, G. H. Fairmont
McGroarty, J. J. Easton
Marken, M. H. Fairmont
Miller, H. A. Fairmont
Mills, J. L. Winnebago
Richardson, W. J. Fairmont
Sommer, A. W. Elmore

CAMP RELEASE DISTRICT MEDICAL SOCIETY

Chippewa, Lac Qui Parle, Sibley, Renville, and Yellow Medicine Counties.

Regular meetings, quarterly.

Annual meeting, subject to call of President.

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Burns, M. A. Milan

Secretary
Holmberg, L. J. Canby

Adams, R. C. Bird Island
Aldrich, F. H. Belview
Bacon, R. S. Montevideo
Bergh, L. N. Montevideo
Brand, W. A. Redwood Falls
Burns, M. A. Milan
Cole, H. B. Redwood Falls
Cress, E. E. Boyd
D'Arms, Harry Lee. Hector
Dordal, J. Sacred Heart

Duncan, Henry. Marietta
Engelhart, P. C. Minneapolis
Erickson, L. G. Wood Lake
Fawcett, A. Maxwell. Renville
Flinn, B. P. Redwood Falls
Flinn, T. E. Redwood Falls
Flower, W. Z. Minneapolis
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Johnson, O. H. Echo
Kaufman, A. J.* Franklin
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Tangen, Geo. M. Canby
Westby, Magnus. Madison
Westby, Nels. Madison

CENTRAL MINNESOTA DISTRICT MEDICAL SOCIETY

Anoka, Isanti, Kanabec, Mille Lacs and Sherburne Counties.

Regular meetings, January, April, and July.

Annual meeting, November.

President
Swenson, Chas. Braham

Secretary
Cooney, H. C. Princeton

Cooney, H. C. Princeton
Hedenstrom, L. H. Cambridge
Holm, C. E. Isle
Kooker, Herman J. Milaca
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Swennes, O. S. Wabkon
Swenson, Chas. Braham
Vik, M. Onamia
Vrooman, F. E. St. Francis

CHISAGO-PINE COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.

Annual meeting, May.

President
Zeien, Thos. North Branch

Secretary
Kelsey, C. G. Hinckley

Bohling, B. S. Sandstone
Callahan, F. F. Pokegama
Dredge, H. P. Sandstone
Flom, A. O. Chisago City
Freymler, E. F. Markville
Holmes, A. E. Rush City
Hultkrans, R. E. Rush City
Kelsey, C. G. Hinckley

Levins, H. E. Askov
Nethercott, E. G. Pine City
Pearson, William T. Finlayson
Stephan, E. L. Hinckley
Stratte, A. K. Pine City
Stratte, Harold C. Windom
Truog, Clarence P. Lindstrom
Zeien, Thos. North Branch

*Deceased

CLAY-BECKER COUNTY MEDICAL SOCIETY

Regular meetings, January, April, July and October.

Annual meeting, October.

| | | |
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| Bergheim, M. C. | President | Hawley |
| Heimark, J. H. | Secretary | Moorhead |
| Aborn, W. H. | | Hawley |
| Archibald, F. M. | | Mahnomen |

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| Bergheim, M. C. | Hawley |
| Bottolfson, B. T. | Moorhead |
| Carmen, J. E. | Detroit Lakes |
| Ellingson, A. R. | Detroit Lakes |
| Gosslee, G. L. | Moorhead |
| Hagen, O. J. | Moorhead |
| Heimark, J. H. | Moorhead |
| Humphrey, E. W. | Moorhead |

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| Larsen, O. O. | Detroit Lakes |
| Rutledge, L. H. | Detroit Lakes |
| Simison, C. W. | Hawley |
| Scott, R. A. | Detroit Lakes |
| Thornby, H. J. | Moorhead |
| Thysell, F. A. | Moorhead |

DODGE COUNTY MEDICAL SOCIETY

Annual meeting, September.

| | | |
|---------------------|-----------|--------------|
| Baker, H. R. | President | Hayfield |
| Bigelow, Charles E. | Secretary | Dodge Center |

| | |
|---------------------|--------------|
| Adams, R. T. | Mantorville |
| Affeldt, Daniel E. | Kasson |
| Baker, Harry R. | Hayfield |
| Bigelow, Charles E. | Dodge Center |

| | |
|-----------------|--------------|
| Flores, O. T. | Dodge Center |
| Smith, Frank D. | Kasson |

FREEBORN COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.

Annual meeting, December.

| | | |
|----------------|-----------|------------|
| Palmer, W. L. | President | Albert Lea |
| Freligh, W. P. | Secretary | Albert Lea |
| Branham, D. S. | | Albert Lea |
| Burns, H. D. | | Albert Lea |

| | |
|----------------|------------|
| Butturf, C. R. | Freeborn |
| Calhoun, F. W. | Albert Lea |
| Folken, F. G. | Albert Lea |
| Freeman, J. P. | Albert Lea |
| Freligh, W. P. | Albert Lea |
| Gamble, J. W. | Albert Lea |
| Gamble, P. M. | Albert Lea |
| Gamble, R. M. | Albert Lea |

| | |
|----------------|-----------------|
| Gullixson, A. | Albert Lea |
| Kaasa, L. J. | Albert Lea |
| Kamp, B. A. | Albert Lea |
| Palmer, C. F. | Albert Lea |
| Palmer, W. L. | Albert Lea |
| Schmitt, O. J. | Sterling, Colo. |
| Schultz, J. A. | Albert Lea |

GOODHUE COUNTY MEDICAL SOCIETY

Annual meeting, December.

| | | |
|-----------------|-----------|----------|
| Smith, M. W. | President | Red Wing |
| Steffens, L. A. | Secretary | Red Wing |
| Aanes, A. M. | | Red Wing |

| | |
|------------------|--------------|
| Anderson, S. H. | Red Wing |
| Claydon, D. R. | Red Wing |
| Claydon, L. E. | Red Wing |
| Conley, Alva A.* | Cannon Falls |
| Cremer, M. H. | Red Wing |
| Johnson, A. E. | Red Wing |
| Jones, A. W. | Red Wing |

| | |
|-----------------|--------------|
| Liffing, W. W. | Goodhue |
| McGuigan, H. T. | Red Wing |
| Smith, M. W. | Red Wing |
| Steffens, L. A. | Red Wing |
| Vaaler, T. | Cannon Falls |

HENNEPIN COUNTY MEDICAL SOCIETY

Regular meetings, first Monday of each month except June, July, August and September.

Annual meeting, first Monday in January.

| | | |
|-----------------------|-----------|-------------|
| Gardner, E. L. | President | Minneapolis |
| Hansen, Erling W. | Secretary | Minneapolis |
| Ahrens, R. S. | | Minneapolis |
| Aling, C. P. | | Minneapolis |
| Allen, H. W. | | Minneapolis |
| Allison, R. G. | | Minneapolis |
| Almquist, H. E. | | Minneapolis |
| Altnow, Hugo O. | | Minneapolis |
| Anderson, A. E. | | Minneapolis |
| Anderson, Arnold S. | | St. Paul |
| Anderson, Arnt G. | | Minneapolis |
| Anderson, David D. | | Minneapolis |
| Anderson, Edward Dyer | | Minneapolis |
| Anderson, Ernest R. | | Minneapolis |
| Anderson, Frank J. | | Minneapolis |
| Anderson, J. K. | | Minneapolis |
| Anderson, Silas C. | | Minneapolis |
| Andrews, R. S. | | Minneapolis |
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| Arey, H. C. | | Excelsior |
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| Baker, Looe | | Minneapolis |
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| Barron, Moses | | Minneapolis |
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| Baxter, S. H. | | Minneapolis |
| Beard, Archie H. | | Minneapolis |
| Beard, R. O. | | Minneapolis |
| Bedford, E. W. | | Minneapolis |

*Deceased

| | |
|----------------------|-------------------|
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| Bell, J. W. | Minneapolis |
| Benedict, E. E. | Minneapolis |
| Benjamin, A. E. | Minneapolis |
| Benn, F. G. | Minneapolis |
| Berglund, Hilding | Minneapolis |
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| Blake, Jas. | Minneapolis |
| Blaustone, Henry H. | Minneapolis |
| Blumenthal, Jacob | Minneapolis |
| Bockman, M. W. H. | Minneapolis |
| Boe, A. M. | Minneapolis |
| Booth, A. E. | Minneapolis |
| Boquist, E. T. W. | Minneapolis |
| Boquist, Harold S. | Minneapolis |
| Boreen, C. A. | Minneapolis |
| Borgeson, E. J. | Minneapolis |
| Bouman, H. A. | Minneapolis |
| Boynton, Ruth | Minneapolis |
| Bracken, H. M. | Claremont, Calif. |
| Bratrud, A. F. | Minneapolis |
| Brown, Edgar D. | Minneapolis |
| Brown, Edw. J. | Minneapolis |
| Bukley, Kenneth | Minneapolis |
| Butler, John | Minneapolis |
| Buzzelle, L. K. | Minneapolis |
| Cable, M. L. | Minneapolis |
| Cabot, George S. | Minneapolis |
| Cabot, V. S. | Minneapolis |
| Cady, L. H. | Minneapolis |
| Callerstrom, G. W. | Minneapolis |
| Cameron, Isabell L. | Minneapolis |
| Camp, W. E. | Minneapolis |
| Campbell, L. M. | Minneapolis |
| Campbell, Orwood J. | Minneapolis |
| Campbell, Robert | Minneapolis |
| Cardle, Archibald E. | Minneapolis |
| Carey, Jas. B. | Minneapolis |
| Carlaw, C. M. | Minneapolis |
| Caron, Robert P. | Minneapolis |
| Cavanor, F. T. | Minneapolis |

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|---------------------|---------------|
| Chamberlain, H. E. | Minneapolis |
| Cheleen, S. J. | Minneapolis |
| Cherry, Chas. H. | Minneapolis |
| Chesley, A. J. | Minneapolis |
| Clark, H. S. | Minneapolis |
| Cohen, S. | Oak Terrace |
| Condit, W. H. | Minneapolis |
| Cook, H. W. | Minneapolis |
| Cooperman, H. O. | Minneapolis |
| Corbett, J. Frank | Minneapolis |
| Corniea, A. D. | Minneapolis |
| Cosman, E. O. | Minneapolis |
| Crafts, Leo M. | Minneapolis |
| Cranmer, Richard R. | Minneapolis |
| Creighton, Ralph H. | Minneapolis |
| Crume, Geo. P. | Minneapolis |
| Curtin, John F. | Minneapolis |
| Cutts, George | Minneapolis |
| Dady, Elmer E. | Minneapolis |
| Dahl, Elmer O. | Minneapolis |
| Dahl, John A. | Minneapolis |
| Daniel, Donald H. | Minneapolis |
| Daniel, Lewis M. | Minneapolis |
| Dart, Leslie O. | Minneapolis |
| Devereaux, T. G. | Wayzata |
| Dewar, J. E. | Minneapolis |
| Deziel, Earl A. | Minneapolis |
| Dexel, G. | Minneapolis |
| Diehl, Harold S. | Minneapolis |
| Dieschner, H. D. | Minneapolis |
| Disen, C. F. | Minneapolis |
| Donaldson, C. A. | Mesa, Arizona |
| Dorge, Richard I. | Minneapolis |
| Dornblaser, H. B. | Minneapolis |
| Doxey, G. L. | Minneapolis |
| Doyle, L. O. | Minneapolis |
| Drake, C. R. | Minneapolis |
| Driesbach, N. | Minneapolis |
| Duff, Edwin R. | Minneapolis |
| Dumas, Alexander G. | Minneapolis |
| Dunlap, E. H. | Minneapolis |
| Dunn, Geo. R. | Minneapolis |
| Dunsmoor, F. A. | Minneapolis |
| Dutton, C. E. | Minneapolis |

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|-----------------------|-------------|------------------------|-------------|-----------------------|-------------|
| Dworsky, Samuel D. | Minneapolis | Holt, Wm. B. | Minneapolis | Mach, Frank B. | Minneapolis |
| Egilsrud, Kristian | Minneapolis | Howard, William H. | Minneapolis | Macnie, J. S. | Minneapolis |
| Ehrenberg, C. J. | Minneapolis | Huenekens, E. J. | Minneapolis | Macnie, John P. | Minneapolis |
| Eitel, Geo. D. | Minneapolis | Hughes, Louis D. | Minneapolis | Maland, C. O. | Minneapolis |
| Ehrlich, S. Paul | Minneapolis | Hurd, Annal | Minneapolis | Mann, A. T. | Minneapolis |
| Ellison, David E. | Minneapolis | Hutchinson, Charles J. | Minneapolis | Mardley, W. J. | Minneapolis |
| Erb, F. A. | Minneapolis | Hymes, Charles | Minneapolis | Mariette, Ernest | Oak Terrace |
| Erdmann, C. A. | Minneapolis | Hynes, James | Minneapolis | Mark, D. B. | Minneapolis |
| Ericson, J. G. | Minneapolis | Hynes, John E. | Minneapolis | Martinson, C. J. | Wayzata |
| Exley, E. W. F. | Minneapolis | Irvine, H. G. | Minneapolis | Matchan, Glen R. | Minneapolis |
| Evans, Edward T. | Minneapolis | Irwin, Alex F. | Minneapolis | Matthews, Justus | Minneapolis |
| Fansler, W. A. | Minneapolis | Jackson, C. M. | Minneapolis | Mattill, P. M. | Oak Terrace |
| Farabaugh, Charles L. | Minneapolis | Jennings, Frank L. | Oak Terrace | Maxeiner, Stanley R. | Minneapolis |
| Farr, R. E. | Minneapolis | Jennings, Mary H. | Minneapolis | May, W. H. | Minneapolis |
| Feeney, John M. | Minneapolis | Jensen, M. J. | Minneapolis | Merkert, Charles E. | Minneapolis |
| Fenger, E. | Oak Terrace | Johnson, A. E. | Minneapolis | Merkert, George L. | Minneapolis |
| Fink, Leo. W. | Minneapolis | Johnson, A. E. | Minneapolis | Meyer, E. L. | Minneapolis |
| Fink, Walter H. | Minneapolis | Johnson, James A. | Minneapolis | Michael, J. C. | Minneapolis |
| Fjeldstad, C. Alfred | Minneapolis | Johnson, Julius | Minneapolis | Michelson, H. E. | Minneapolis |
| Fleming, A. S. | Minneapolis | Johnson, Nimrod A. | Minneapolis | Moen, J. K. Jr. | Minneapolis |
| Foster, W. K. | Minneapolis | Johnson, Norman | Minneapolis | Moir, Wm. W. | Minneapolis |
| Fowler, L. H. | Minneapolis | Johnson, Odin J. | Minneapolis | Monahan, R. H. | Minneapolis |
| Fox, John M. | Minneapolis | Johnson, R. A. | Minneapolis | Moorhead, M. B. | Minneapolis |
| Fredericks, George M. | Minneapolis | Johnson, Selmer M. | Minneapolis | Moren, Edwin | Minneapolis |
| Friedell, A. | Minneapolis | Jones, G. M. | Minneapolis | Moriarty, Cecile E. | Minneapolis |
| Funk, Victor K. | Oak Terrace | Jones, H. W. | Minneapolis | Morrison, A. W. | Minneapolis |
| Gammell, J. H. | Minneapolis | Jones, W. R. | Minneapolis | Morton, H. McI. | Minneapolis |
| Garand, J. H. | Dayton | Jones, William R. | Minneapolis | Murphy, Ignatius J. | Minneapolis |
| Gardner, Edwin L. | Minneapolis | Josewich, Alexander | Minneapolis | Myers, J. A. | Minneapolis |
| Geist, Emil S. | Minneapolis | Kelby, G. M. | Minneapolis | Nathanson, M. H. | Minneapolis |
| Giere, E. O. | Minneapolis | Kennedy, C. C. | Minneapolis | Nelson, C. P. | Minneapolis |
| Giere, J. C. | Minneapolis | Kennedy, Jane F. | Minneapolis | Nelson, H. S. | Minneapolis |
| Giere, Richard W. | Minneapolis | Kennedy, R. Roy | Minneapolis | Nelson, O. E. | Minneapolis |
| Giessler, Paul W. | Minneapolis | Kibbe, O. A. | Minneapolis | Newhart, Horace | Minneapolis |
| Gillis, F. L. | Minneapolis | King, E. A. | Minneapolis | Nordin, G. T. | Minneapolis |
| Gingold, Benjamin A. | Minneapolis | King, Harry T. | Minneapolis | Nordland, Martin | Minneapolis |
| Ginsberg, Harry | Minneapolis | King, W. R. | Minneapolis | Noth, H. W. | Minneapolis |
| Girvin, Richard B. | Minneapolis | Kinsella, Thomas J. | Oak Terrace | O'Brien, Wm. A. | Minneapolis |
| Goldberg, Isadore M. | Minneapolis | Kistler, A. J. | Minneapolis | O'Donnell, J. E. | Minneapolis |
| Gosin, D. F. | Minneapolis | Kistler, C. M. | Minneapolis | Oberg, C. M. | Minneapolis |
| Gratzek, Frank R. | Minneapolis | Knight, Ralph T. | Minneapolis | Olson, F. A. | Minneapolis |
| Grave, Floyd | Minneapolis | Knight, Ray Roberts | Minneapolis | Olson, Olaf A. | Minneapolis |
| Green, E. K. | Minneapolis | Koch, John C. | Minneapolis | Olson, R. G. | Minneapolis |
| Greene, W. P. | Minneapolis | Kohler, Geo. A. | Minneapolis | Owre, Oscar | Minneapolis |
| Greishmer, Esther M. | Minneapolis | Koller, Herman M. | Minneapolis | Parks, A. H. | Minneapolis |
| Gunderson, Nels A. | Minneapolis | Koller, L. R. | Minneapolis | Patterson, W. E. | Minneapolis |
| Gustafson, H. T. | Minneapolis | Kremer, Walter J. | Minneapolis | Paulsen, E. L. | Minneapolis |
| Hacking, Frank H. | Minneapolis | Kriedt, Daniel | Minneapolis | Pearce, N. O. | Minneapolis |
| Haddow, N. W. | Minneapolis | Kucera, Frank J. | Hopkins | Pederson, Harold | Minneapolis |
| Hagen, G. L. | Minneapolis | Kucera, Wm. J. | Minneapolis | Pederson, R. M. | Minneapolis |
| Haggard, G. D. | Minneapolis | Kuskke, A. L. | New Ulm | Peppard, T. A. | Minneapolis |
| Hall, J. M. | Minneapolis | Lajoie, John M. | Minneapolis | Perry, Ralph St. John | Minneapolis |
| Hall, S. S. | Minneapolis | Lapierre, A. P. | Minneapolis | Peters, R. M. | Minneapolis |
| Hallberg, C. A. | Minneapolis | Lapierre, C. A. | Minneapolis | Petersen, J. R. | Minneapolis |
| Hamel, Arnold L. | Minneapolis | Lapierre, J. T. | Minneapolis | Petersen, Thorvald | Minneapolis |
| Hamilton, A. S. | Minneapolis | Larson, Clarence M. | Minneapolis | Peterson, H. W. | Minneapolis |
| Hamlin, George B. | Minneapolis | La Vake, R. T. | Minneapolis | Peterson, O. H. | Minneapolis |
| Hammond, A. J. | Minneapolis | Law, A. A. | Minneapolis | Peterson, Willard C. | Minneapolis |
| Hannah, Hewitt B. | Minneapolis | Lawrent, A. A. | Minneapolis | Petit, L. J. | Minneapolis |
| Hansen, A. E. | Minneapolis | Lazar, H. L. | Minneapolis | Petter, Charles K. | Oak Terrace |
| Hansen, Erling | Minneapolis | Leavitt, H. H. | Minneapolis | Pettit, C. W. | Minneapolis |
| Hansen, Olga S. | Minneapolis | Lebowski, Joseph A. | Minneapolis | Pfunder, M. C. | Minneapolis |
| Hanson, Harlow J. | Minneapolis | Lee, H. M. | Minneapolis | Phelps, Kenneth A. | Minneapolis |
| Hanson, H. V. | Minneapolis | Leland, Harold R. | Minneapolis | Platou, E. S. | Minneapolis |
| Hare, E. R. | Minneapolis | Leland, M. M. | Minneapolis | Pollard, D. W. | Minneapolis |
| Harrington, C. D. | Minneapolis | Lemstrom, Jarl | Minneapolis | Polzak, Jacob A. | Minneapolis |
| Harrington, H. E. | Minneapolis | Leonard, L. E. | Minneapolis | Poppe, Fred H. | Minneapolis |
| Hartzell, Thos. B. | Minneapolis | Levine, N. | Minneapolis | Porter, O. M. | Minneapolis |
| Hastings, D. R. | Minneapolis | Lillehei, E. J. | Minneapolis | Potter, Edith L. | Minneapolis |
| Hathaway, J. C. | Minneapolis | Lind, C. J. | Minneapolis | Pratt, Fred J. | Minneapolis |
| Haverfield, Addie R. | Minneapolis | Lindquist, R. H. | Minneapolis | Pratt, J. A. | Minneapolis |
| Hawkinson, R. P. | Minneapolis | Linner, H. P. | Minneapolis | Preine, I. A. | Minneapolis |
| Hayes, J. M. | Minneapolis | Linton, Wm. B. | Minneapolis | Frim, J. A. | Minneapolis |
| Head, Douglas P. | Minneapolis | List, Walter E. | Minneapolis | Proshak, Charles E. | Minneapolis |
| Head, G. D. | Minneapolis | Litchfield, John T. | Minneapolis | Quinby, Thomas F. | Minneapolis |
| Hearn, Wm. O. | Minneapolis | Litzenberg, J. C. | Minneapolis | Quist, H. W. M. | Minneapolis |
| Hedchack, A. E. | Minneapolis | Logeheil, Rudolph C. | Minneapolis | Reed, Chas. A. | Minneapolis |
| Hedding, J. | Minneapolis | Long, Jesse | Minneapolis | Rees, S. P. | Minneapolis |
| Heim, Russell E. | Minneapolis | Loomis, E. A. | Minneapolis | Regnier, E. A. | Minneapolis |
| Helk, H. H. | Minneapolis | Lundgren, A. C. | Minneapolis | Reynolds, J. S. | Minneapolis |
| Hendrickson, J. F. | Minneapolis | Lundquist, E. F. | Minneapolis | Richardson, Fred S. | Minneapolis |
| Henry, C. E. | Minneapolis | Lynch, M. J. | Minneapolis | Richdorf, L. F. | Minneapolis |
| Henry, Myron O. | Minneapolis | Lyng, John A. | Minneapolis | Ridgway, Florence | Minneapolis |
| Herbolzheimer, A. J. | Minneapolis | Lyon, E. P. | Minneapolis | Rigler, Leo G. | Minneapolis |
| Herbst, Wm. P. | Minneapolis | Lyon, J. D. | Minneapolis | Rishmiller, J. H. | Minneapolis |
| Herman, Arthur L. | Minneapolis | Lyssne, Henry | Minneapolis | Rizer, R. L. | Minneapolis |
| Hiebert, J. P. A. | Minneapolis | McCarthy, Donald | Minneapolis | Roan, Carl M. | Minneapolis |
| Higbee, Paul | Minneapolis | McCartney, James S. | Minneapolis | Robb, Edwin F. | Minneapolis |
| Higgins, J. H. | Minneapolis | McDaniel, Orianna | Minneapolis | Roberts, W. B. | Minneapolis |
| Hilbert Eunice | Minneapolis | McEachran, A. | Minneapolis | Robitsek, E. C. | Minneapolis |
| Hill, Eleanor J. | Minneapolis | McFarland, A. H. | Minneapolis | Rochford, W. E. | Minneapolis |
| Hirschfelder, A. D. | Minneapolis | McGandy, R. F. | Minneapolis | Rodda, F. C. | Minneapolis |
| Hirshfield, Adolph | Minneapolis | McGeary, Geo. E. | Minneapolis | Rodgers, C. L. | Minneapolis |
| Hirshfield, F. R. | Minneapolis | McIntyre, Geo. | Minneapolis | Rosen, S. | Minneapolis |
| Hoaglund, A. W. | Minneapolis | McKinley, C. A. | Minneapolis | Rosenberg, George C. | Minneapolis |
| Hobbs, C. A. | Minneapolis | McKinley, J. C. | Minneapolis | Rosenberg, Maurice N. | Minneapolis |
| Hodge, S. V. | Minneapolis | McKinney, F. S. | Minneapolis | Rosenwald, R. M. | Minneapolis |
| Holander, A. S. | Minneapolis | McPeeters, H. O. | Minneapolis | Rucker, Charles W. | Minneapolis |
| Holen, T. | Minneapolis | MacDonald, A. E. | Minneapolis | Rucker, William H. | Minneapolis |
| Holl, P. M. | Minneapolis | MacDonald, D. A. | Minneapolis | Rudell, Gustave | Minneapolis |
| Holm, Geo. A. | Minneapolis | MacDonald, Irving C. | Minneapolis | Sadler, William P. | Minneapolis |
| | | | | Sawatzky, Wm. A. | Minneapolis |

Schaaf, F. H. K. Minneapolis
 Schaefer, Wesley G. Minneapolis
 Scheldrup, N. H. Minneapolis
 Schlutz, Frederic W. Minneapolis
 Schmidt, Geo. F. Minneapolis
 Schmitt, A. F. Minneapolis
 Schussler, Otto F. Minneapolis
 Schwartz, Virgil J. Minneapolis
 Schwytzer, Gustav Minneapolis
 Schwytzer, Robert Minneapolis
 Scott, F. H. Minneapolis
 Seashore, Gilbert Minneapolis
 Seham, Max Minneapolis
 Selleseth, Iver Minneapolis
 Sessions, John C. Minneapolis
 Simons, Jalmar Minneapolis
 Simpson, E. D. Minneapolis
 Simpson, J. D. Minneapolis
 Siperstein, D. M. Minneapolis
 Sivertson, Ivar Minneapolis
 Slocumb, Maude S. Minneapolis
 Smith, A. M. Minneapolis
 Smith, Arthur E. Minneapolis
 Smith, Homer R. Minneapolis
 Smith, Norman S. Minneapolis
 Soderlind, Ragnar T. Minneapolis
 Solhaug, S. B. Minneapolis
 Spratt, C. N. Minneapolis
 Stelter, Lloyd A. Minneapolis
 Stewart, C. A. Minneapolis
 Stewart, R. L. Minneapolis
 Stonel, Joseph Minneapolis
 Strauchauer, A. C. Minneapolis
 Strout, E. S. Minneapolis
 Strout, G. Elmer Minneapolis

Sturte, J. R. Minneapolis
 Sundt, M. Minneapolis
 Swanson, Cephas Minneapolis
 Swanson, Roy E. Minneapolis
 Sweetser, H. B. Minneapolis
 Sweetser, H. B. Jr. Minneapolis
 Sweetser, Theodore Minneapolis
 Sweitzer, S. E. Minneapolis
 Swendsen, Carl G. Minneapolis
 Taft, John O. Minneapolis
 Tanner, A. C. Minneapolis
 Taylor, Rood Minneapolis
 Ternstrom, O. H. Minneapolis
 Thomas, Geo. E. Minneapolis
 Thomas, Geo. H. Minneapolis
 Thomas, Gilbert J. Minneapolis
 Tingdale, A. C. Minneapolis
 Trueman, H. S. Minneapolis
 Tunstead, Hugh J. Minneapolis
 Turncliff, D. D. Minneapolis
 Tyrell, C. C. Minneapolis
 Ude, Walter H. Minneapolis
 Ulrich, Henry L. Minneapolis
 Undine, Clyde A. Minneapolis
 Urner, John A. Minneapolis
 Vik, A. Elliott Minneapolis
 Vogel, Melvin A. Minneapolis
 Voyer, Emile O. Minneapolis
 Wahlgvist, Harold F. Minneapolis
 Waldron, Carl W. Minneapolis
 Wall, C. Ragnar Minneapolis
 Wangensteen, O. H. Minneapolis
 Wanous, E. Z. Minneapolis
 Ward, A. W. Minneapolis
 Ward, Percy A. Minneapolis

Warham, T. T. Minneapolis
 Watson, J. A. Minneapolis
 Webb, R. C. Minneapolis
 Weisman, S. A. Minneapolis
 Welles, H. J. Minneapolis
 Wethall, A. G. Minneapolis
 Wetherby, Macnider Minneapolis
 Weum, T. Wm. Minneapolis
 White, S. Marx Minneapolis
 White, Willard D. Minneapolis
 Widen, W. F. Minneapolis
 Wiese, H. F. B. Minneapolis
 Wilcox, Archib. E. Minneapolis
 Wilder, Robert L. Minneapolis
 Wilken, Paul A. Minneapolis
 Willcutt, Clarence Minneapolis
 Williams, H. L. Minneapolis
 Williams, Lowell E. Oak Terrace
 Williams, Robert Minneapolis
 Witham, C. A. Minneapolis
 Wittich, F. W. Minneapolis
 Wohlrahe, A. A. Minneapolis
 Wood, Douglas F. Minneapolis
 Woodworth, Elizabeth Minneapolis
 Wright, C. B. Minneapolis
 Wright, Charles D'a. Minneapolis
 Wright, Franklin R. Minneapolis
 Wynne, H. M. N. Minneapolis
 Yvisaker, R. S. Minneapolis
 Yoerg, O. W. Minneapolis
 Zanger, Isabelle M. Minneapolis
 Zaworski, E. A. Minneapolis
 Ziskin, Thos. Minneapolis

HOUSTON-FILLMORE COUNTY MEDICAL SOCIETY

Regular meetings, not stated.

Annual meeting, October.

President
 Williams, R. V. Rushford
 Secretary
 Helland, J. W. Spring Grove
 Anderson, Norman E. Harmony
 Baldwin, A. E. Houston
 Beiswanger, R. H. Wykoff
 Belote, G. B. Caledonia

Canfield, Wayne W. Houston
 Christianson, H. W. Rochester
 Davis, I. Grant Peterson
 Drake, F. A. Lanesboro
 Eby, C. B. Spring Valley
 Edward, George Canton
 Grinnell, W. B. Preston
 Helland, G. M. Spring Grove
 Helland, J. W. Spring Grove

Lannin, J. C. Mabel
 Lommen, A. P. Lanesboro
 Nass, H. A. Mabel
 Osgard, L. K. Houston
 Palmer, R. M. Lanesboro
 Tierney, C. N. Harmony
 Williams, R. V. Rushford
 Woodruff, C. W. Chatfield

KANDIYOHI-SWIFT COUNTY MEDICAL SOCIETY

Regular meetings, at call of President.

Annual meeting, December.

President
 Behmler, F. W. Appleton
 Secretary
 Scofield, C. L. Benson
 Anderson, R. E. Willmar
 Arnsen, J. M. Benson
 Behmler, F. W. Appleton

Branton, A. F. Willmar
 Branton, B. J. Willmar
 Daigault, Oscar Benson
 Dowswell, W. J. Kerkhoven
 Fredrickson, Alice Lake Lillian
 Fredrickson, Guy Lake Lillian
 Frisch, F. T. Willmar
 Giere, S. W. Benson
 Hodapp, R. J. Willmar

Hutchinson, Henry New London
 Jacobs, John C. Willmar
 Jensen, Herman H. Atwater
 Johnson, Hans Kerkhoven
 Kaufmann, Wm. Appleton
 Rains, J. M. Willmar
 Scofield, C. L. Benson
 Thompson, Arthur Raymond

LYON-LINCOLN COUNTY MEDICAL SOCIETY

Regular meetings, monthly.

Annual meeting, first Tuesday in October.

President
 Hermanson, Peter E. Hendricks
 Secretary
 Workman, H. M. Tracy
 Akester, Ward Marshall
 Bossingham, O. N. Lake Benton
 Chunn, Stanley S. Lake Wilson

Erickson, J. L. Hendricks
 Ford, B. C. Marshall
 Germs, Chas. Balaton
 Gray, F. D. Marshall
 Hermanson, Peter E. Hendricks
 Hoidale, A. D. Tracy
 Jacquot, G. L. Marshall
 Persons, C. E. Marshall

Robertson, J. B. Cottonwood
 Sanderson, E. T. Minnesota
 Thordarson, Theo. Minnesota
 Vadheim, A. L. Tyler
 Valentine, W. H. Tracy
 Workman, H. M. Tracy
 Workman, W. G. Tracy
 Yaeger, W. W. Ivanhoe

MCLEOD COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.

Annual meeting, September.

President
 Trutna, Thos. J. Silver Lake
 Secretary
 Jensen, A. H. Hutchinson

Clement, J. B. Lester Prairie
 Holm, H. H. Glencoe
 Hutterer, Edw. G. Winsted
 Jensen, A. H. Hutchinson
 Klima, W. W. Stewart
 Langhoff, A. H. Glencoe

Remple, D. D. Brownton
 Sahr, W. G. Hutchinson
 Scholpp, O. W. Hutchinson
 Sheppard, Fred Hutchinson
 Sheppard, P. E. Hutchinson
 Trutna, Thos. J. Silver Lake

MEEKER COUNTY MEDICAL SOCIETY

Regular meetings, May, August and October.

Annual meeting, December.

President
 Dulude, S. S. Dassel
 Secretary
 Danielson, K. A. Litchfield

Brigham, Frank Watkins
 Danielson, K. A. Litchfield
 Dulude, S. S. Dassel
 O'Connor, D. C. Eden Valley

Peterson, A. C. Dassel
 Robertson, A. W. Litchfield
 Robertson, W. P. Litchfield
 Wilmot, H. E. Litchfield

MOWER COUNTY MEDICAL SOCIETY

Regular meetings, last Thursday of each month except July and August.

Annual meeting, last Thursday in November.

President
Havens, J. G. W. _____ Austin

Secretary
Sheedy, C. L. _____ Austin

Allen, A. W. _____ Austin
Allen, Chas. C. _____ Austin
Cobb, Willis F. _____ Lyle
Coleman, F. B. _____ Austin

Grise, W. B. _____ Austin
Havens, J. G. W. _____ Austin
Hegge, O. H. _____ Austin
Hegge, R. S. _____ Austin
Henslin, A. E. _____ Le Roy
Hertel, G. E. _____ Austin
Kreuzer, Titus C. _____ Austin
Leck, Clifford C. _____ Austin
Lewis, Chas. F. _____ Austin

Lommen, P. A. _____ Austin
McKenna, J. K. _____ Austin
Meizer, G. R. _____ Lyle
Mitchell, R. S. _____ Grand Meadow
Morrow, J. J. _____ Austin
Morse, M. P. _____ Le Roy
Rebman, E. C. _____ Austin
Sheedy, Chester L. _____ Austin
Torkelson, P. T. _____ Lyle

NICOLLET-LE SUEUR COUNTY MEDICAL SOCIETY

Regular meetings, June, September and December.

Annual meeting, December.

President
Aitkens, H. B. _____ LeSueur Center

Secretary
Daniels, Jared W. _____ St. Peter

Aitkens, H. B. _____ LeSueur Center
Covell, W. W. _____ St. Peter
Daniels, Jared W. _____ St. Peter

Dodge, Frank A. _____ Le Sueur
Ericson, Swan. _____ Le Sueur
Freeman, George H. _____ St. Peter
Goforth, Clifford _____ St. Peter
Hiniker, Peter J. _____ Le Sueur
Holtan, Theodore _____ Waterville
Kerschbaumer, Louisa _____ St. Peter
Lenander, Melvin E. _____ St. Peter
McKechnie, Wilfred _____ St. Peter

McKeon, Joseph O. _____ Montgomery
Peterson, Magnus C. _____ St. Peter
Smith, Benjamin F. _____ Willmar
Stewart, N. W. _____ North Mankato
Strathern, Fred P. _____ St. Peter
Traxler, Felix J. _____ Henderson
Wolner, Oscar H. _____ St. Peter

OLMSTED COUNTY MEDICAL SOCIETY

Regular meetings, second Wednesday in April, June, September and December.

Annual meeting, November.

President
McKaig, C. B. _____ Pine Island

Secretary
Piper, M. C. _____ Rochester

Abbott, W. D. _____ Rochester
Adams, S. F. _____ Rochester
Adson, A. W. _____ Rochester
Allan, F. N. _____ Rochester
Allen, E. V. _____ Rochester
Allen, R. W. _____ Rochester
Allen, W. A. _____ Rochester
Alvarez, W. C. _____ Rochester
Amberg, Samuel _____ Rochester
Anderson, C. M. _____ Rochester
Anderson, E. W. _____ Rochester
Anderson, M. J. _____ Rochester
Anderson, R. M. _____ Rochester
Anderson, R. S. _____ Rochester
Bain, C. G. _____ Rochester
Balfour, D. C. _____ Rochester
Ball, R. G. _____ Rochester
Bannick, E. G. _____ Rochester
Barborka, C. J. _____ Rochester
Bargen, J. A. _____ Rochester
Barker, N. W. _____ Rochester
Barnes, A. R. _____ Rochester
Bartels, E. C. _____ Rochester
Bayard, H. F. _____ Rochester
Beaver, M. G. _____ Rochester
Benedict, W. L. _____ Rochester
Berkman, D. M. _____ Rochester
Berkman, J. M. _____ Rochester
Binger, N. W. _____ Rochester
Birkeland, I. W. _____ Rochester
Bliss, T. L. _____ Rochester
Boeck, W. C. _____ Rochester
Boesel, R. J. _____ Rochester
Bonesteel, H. T. S. _____ Rochester
Bonta, M. B. _____ Rochester
Boothby, W. M. _____ Rochester
Bowling, H. H. _____ Rochester
Brasch, W. F. _____ Rochester
Bradley, J. W. _____ Rochester
Broders, A. C. _____ Rochester
Brown, A. E. _____ Rochester
Brown, C. B. _____ Rochester
Brown, G. E. _____ Rochester
Brown, P. W. _____ Rochester
Bruner, J. M. _____ Rochester
Brunsting, L. A. _____ Rochester
Buie, L. A. _____ Rochester
Bumpus, H. C. _____ Rochester
Bumpus, L. D. _____ Rochester
Burke, Charles F. _____ Rochester
Cameron, M. C. Jr. _____ Rochester
Camp, J. D. _____ Rochester
Carmichael, H. T. _____ Rochester
Cathcart, Edward _____ Rochester
Chapman, C. B. _____ Rochester
Childrey, J. H. _____ Rochester
Christensen, E. E. _____ Rochester

Haines, S. F. _____ Rochester
Hallenbeck, D. F. _____ Rochester
Hand, J. R. _____ Rochester
Hane, K. L. _____ Rochester
Hanlon, F. R. _____ Rochester
Hardeman, D. R. Jr. _____ Rochester
Harrington, S. W. _____ Rochester
Hartman, H. R. _____ Rochester
Hartwell, S. W. _____ Muskegon
Hartzell, J. B. _____ Rochester
Havens, F. Z. _____ Rochester
Hazeltine, M. E. _____ Rochester
Heck, F. J. _____ Rochester
Hefke, H. W. _____ Rochester
Heimdal, C. O. _____ Rochester
Helmholz, H. F. _____ Rochester
Hempstead, B. E. _____ Rochester
Hench, P. S. _____ Rochester
Henderson, M. S. _____ Rochester
Heyerdale, O. C. _____ Rochester
Hill, F. C. _____ Rochester
Hillyard, L. V. _____ Rochester
Holland, W. W. _____ Rochester
Hooker, J. A. _____ Rochester
Horton, B. T. _____ Rochester
Hunt, V. C. _____ Rochester
Hurt, A. S. Jr. _____ Rochester
Hyde, Theodore L. _____ Rochester
Johnson, H. W. E. _____ Rochester
Johnson, W. R. _____ Rochester
Jordan, F. M. _____ Rochester
Joyce, G. L. _____ Stewartville
Joyce, G. T. _____ Rochester
Judd, E. S. _____ Rochester
Keith, H. M. _____ Rochester
Keith, N. M. _____ Rochester
Kennedy, R. L. J. _____ Rochester
Kepler, E. J. _____ Rochester
Kernohan, J. W. _____ Rochester
Kilbourne, A. F. _____ Rochester
Kilgore, G. L. _____ Rochester
Kintner, A. R. _____ Rochester
Kirkin, B. R. _____ Rochester
Lacy, N. E. _____ Rochester
Larson, Lawrence M. _____ Rochester
Learnmonth, J. R. _____ Rochester
Ledy, E. T. _____ Rochester
Lemon, W. S. _____ Rochester
Lillie, H. I. _____ Rochester
Lillie, W. L. _____ Rochester
Lineberry, E. D. _____ Rochester
Lochead, D. C. _____ Rochester
Logan, A. H. _____ Rochester
Loney, W. R. R. _____ Rochester
Loughery, H. B. _____ Rochester
Love, J. G. _____ Rochester
Lundy, J. S. _____ Rochester
Magath, T. B. _____ Rochester
Magee, H. R. _____ Rochester
Mahorner, H. R. _____ Rochester
Major, S. G. _____ Rochester
Malmgren, G. E. _____ Rochester
Margolis, H. M. _____ Rochester
Marshall, J. M. _____ Rochester

*Deceased

Mason, J. B. Rochester
 Masson, D. M. Rochester
 Masson, J. C. Rochester
 Mattson, Hamline. Rochester
 Mayo, C. H. Rochester
 Mayo, C. W. Rochester
 Mayo, J. G. Rochester
 Mayo, W. J. Rochester
 Maytum, C. K. Rochester
 McBride, W. P. Rochester
 McCarty, R. B. Rochester
 McCaughan, J. M. Rochester
 McCuskey, C. F. Rochester
 McKaig, C. B. Pine Island
 Metheny, David. Rochester
 Meyerding, H. W. Rochester
 Mills, R. G. Rochester
 Moench, L. M. Rochester
 Moersch, F. P. Rochester
 Moersch, H. J. Rochester
 Mohardt, J. H. Rochester
 Montgomery, Hamilton. Rochester
 Moore, A. B. Rochester
 Morehead, D. E. Rochester
 Morgan, Sherburn F. Rochester
 Morton, H. B. Rochester
 Mroz, R. J. Rochester
 Mueller, S. C. Rochester
 Mulholland, S. W. Rochester
 Murphy, G. T. Rochester
 Mussey, R. D. Rochester
 Nabers, L. W. Rochester
 Nelson, W. L. Rochester
 Nesbit, M. E. Rochester
 New, G. B. Rochester
 Nickel, A. A. C. Rochester
 Norment, W. B. Rochester
 Norton, M. W. Rochester
 Nunn, L. L. Rochester
 Nutting, R. E. Rochester
 O'Leary, P. A. Rochester
 Ochser, H. C. Rochester
 Offutt, S. R. Rochester
 Ohlinger, L. B. Chicago, Illinois

Olson, E. A. Pine Island
 Palmer, B. M. Rochester
 Parker, H. L. Rochester
 Partsch, W. T. Rochester
 Pemberton, J. deJ. Rochester
 Peterson, J. A. Rochester
 Pfeffer, T. J. Rochester
 Piper, M. C. Rochester
 Plummer, H. S. Rochester
 Plummer, W. A. Rochester
 Pollock, L. W. Rochester
 Powelson, H. C. Rochester
 Prangen, A. D. Rochester
 Prescott, M. U. Rochester
 Prickman, L. E. Rochester
 Priestley, J. T. Rochester
 Priestley, J. B. Rochester
 Puestow, C. B. Rochester
 Radtke, H. P. Rochester
 Randall, L. M. Rochester
 Rankin, F. W. Rochester
 Rentschler, E. B. Rochester
 Reuter, M. J. Rochester
 Rieniets, J. H. Rochester
 Rivers, A. B. Rochester
 Robertson, H. E. Rochester
 Rogers, J. C. T. Rochester
 Rosenow, E. C. Rochester
 Rowntree, L. G. Rochester
 Ruedemann, E. Rochester
 Rynearson, E. H. Rochester
 Sanford, A. H. Rochester
 Schacht, F. W. Rochester
 Schaefer, Joseph F. Rochester
 Scott, D. E. Rochester
 Shane, James H. Rochester
 Sheldon, W. D. Rochester
 Smith, F. L. Rochester
 Smith, H. L. Rochester
 Smith, L. M. Rochester
 Smith, N. D. Rochester
 Smith, W. M. Rochester
 Snell, A. M. Rochester
 Spannuth, J. R. Rochester

Stacy, L. J. Rochester
 Stark, W. E. Rochester
 Steven, G. Byron
 Stevens, R. B. Rochester
 Steward, J. A. Rochester
 Stewart, C. C. Jr. Rochester
 Stuhler, L. G. Rochester
 Sussex, L. T. Rochester
 Sutherland, C. G. Rochester
 Sutton, L. F. Mazepa
 Swart, H. A. Rochester
 Thomas, L. C. Rochester
 Thompson, F. R. Rochester
 Thompson, G. J. Rochester
 Thompson, H. L. Rochester
 Tinkess, D. E. Rochester
 Vanzant, F. R. Rochester
 Verbruggen, A. H. P. E. Rochester
 Vinson, P. P. Rochester
 Von Lackum, W. H. Rochester
 Watkins, C. H. Rochester
 Wagener, H. P. Rochester
 Waldron, G. W. Rochester
 Walker, M. A. Rochester
 Walters, Waltman. Rochester
 Weber, H. M. Rochester
 Webster, William W. Rochester
 Weir, J. F. Rochester
 Wellbrock, W. L. A. Rochester
 White, J. H. Rochester
 Wilbur, D. L. Rochester
 Wilhelmj, C. M. Rochester
 Williams, H. L. Jr. Rochester
 Willius, F. A. Rochester
 Wilson, L. B. Rochester
 Woltman, H. W. Rochester
 Wood, H. G. Rochester
 Wright, W. C. Rochester
 Yesko, S. A. Rochester
 Zillesen, Frederick O. Rochester
 Zinn, Charles J. Rochester
 Ziegler, L. H. Rochester

PARK REGION DISTRICT AND COUNTY MEDICAL SOCIETY

Otter Tail, Wilkin, Grant and Douglas Counties.

Regular meetings, second Wednesday in January, April, July and October.

Annual meeting, second Wednesday in October.

President
 Satersmoen, Theo. Fergus Falls
 Secretary
 Heiberg, E. A. Fergus Falls
 Baker, A. C. Fergus Falls
 Boysen, P. Pelican Rapids
 Brabec, F. J. Perham
 Brabec, P. F. Perham
 Broker, W. S. Battle Lake
 Burnap, W. L. Fergus Falls
 Drought, W. W. Fergus Falls
 Esser, J. Perham

Estrem, C. O. Fergus Falls
 Frechorn, J. A. Fergus Falls
 Hand, W. R. Elbow Lake
 Haskell, A. D. Alexandria
 Heiberg, E. A. Fergus Falls
 Houkom, B. Fergus Falls
 Johnson, O. V. Fergus Falls
 Kemp, M. W. Fergus Falls
 Kierland, P. E. Alexandria
 Kittelson, T. N. Fergus Falls
 Lee, W. A. Fergus Falls
 Leibold, H. H. Parkers Prairie
 Lewis, A. J. Hennings
 Love, F. A. Carlos

Meckstroth, C. W. Brandon
 Naegeli, F. Fergus Falls
 Nelson, O. N. Battle Lake
 Nelson, W. I. Underwood
 Otto, H. C. Frazee
 Parson, L. R. Elbow Lake
 Patterson, W. L. Fergus Falls
 Paulson, T. S. Fergus Falls
 Platt, F. B. Battle Lake
 Satersmoen, T. Pelican Rapids
 Tanquist, E. J. Alexandria
 Vail, J. B. Hennings
 Wray, W. E. Campbell

RAMSEY COUNTY MEDICAL SOCIETY

Regular meetings, last Monday of month except June, July and August.

Annual meeting, last Monday of January.

President
 Schuldt, F. C. St. Paul
 Secretary
 Schulze, A. G. St. Paul
 Ahrens, A. E. St. Paul
 Ahrens, A. H. St. Paul
 Alberts, Max W. St. Paul
 Alden, J. F. St. Paul
 Aldes, Harry. St. Paul
 Alexander, F. H. St. Paul
 Allen, Mason. St. Paul
 Arends, A. L. Wright
 Armstrong, J. M. St. Paul
 Arnquist, A. S. St. Paul
 Aurelius, J. R. St. Paul
 Bacon, Donald K. St. Paul
 Bacon, Knox. San Diego, Cal.
 Bacon, L. C. St. Paul
 Balcome, F. E. St. Paul
 Ball, C. R. St. Paul
 Barry, L. W. St. Paul
 Barnes, Nellie. St. Paul
 Beadie, W. D. Cannon Falls
 Beals, Hugh. St. Paul
 Bell, C. C. St. Paul
 Benepe, L. M.* St. Paul
 Bennion, P. H. St. Paul

Bentley, Norman P. St. Paul
 Berrisford, P. D. St. Paul
 Binger, H. E. St. Paul
 Birnberg, T. L. St. Paul
 Bock, R. A. St. Paul
 Boeckmann, Egil. St. Paul
 Bohland, E. H. St. Paul
 Bole, R. S. St. Paul
 Borg, J. F. St. Paul
 Bouma, L. R. St. Paul
 Brand, G. D. St. Paul
 Bray, E. R. St. Paul
 Brimhall, J. B. St. Paul
 Brodie, Walter D. St. Paul
 Brooks, D. F. St. Paul
 Brooks, G. F. St. Paul
 Brown, J. C. St. Paul
 Brown, S. E. St. Paul
 Burch, F. E. St. Paul
 Burfiend, G. H. St. Paul
 Burns, F. W. St. Paul
 Burns, R. M. St. Paul
 Burton, Carl G. St. Paul
 Busher, H. St. Paul
 Caldwell, James P. St. Paul
 Caldwell, Kenneth S. St. Paul
 Cameron, J. A. St. Paul
 Campbell, J. E. So. St. Paul
 Cannon, Harry. St. Paul
 Carroll, Wm. C. St. Paul

Carter, Fred G. St. Paul
 Chatterton, C. C. St. Paul
 Christiansen, A. St. Paul
 Christison, J. T. St. Paul
 Clark, T. C. Minneapolis
 Cobb, S. G. St. Paul
 Colby, Woodard. St. Paul
 Cole, Wallace H. St. Paul
 Colvin, A. R. St. Paul
 Comstock, A. E. St. Paul
 Conner, William H. Minneapolis
 Conner, C. E. St. Paul
 Cook, Paul B.* St. Paul
 Countryman, Roger S. St. Paul
 Cowern, E. W. North St. Paul
 Critchfield, L. R. St. Paul
 Crump, J. W. St. Paul
 Culligan, John M. St. Paul
 Culligan, Leo. C. St. Paul
 Dack, L. G. St. Paul
 Darling, J. B. St. Paul
 Daugherty, E. B. St. Paul
 Daugherty, L. E. St. Paul
 Davis, Herbert. St. Paul
 Davis, William. St. Paul
 Dedolph, Karl. St. Paul
 Delougherty, J. St. Paul
 Derauf, B. I. St. Paul
 Dickson, Thomas H. Jr. St. Paul
 Dittman, Geo. C. St. Paul

*Deceased

| | | | | | |
|-----------------------|----------|-------------------------|---------------|-----------------------|--------------|
| Dohm, A. J. | St. Paul | Johnson, Asa M. | St. Paul | Pedersen, A. H. | St. Paul |
| Donohue, P. F. | St. Paul | Johnson, Hartland C. | St. Paul | Penny, L. E. | St. Paul |
| Drake, Carl B. | St. Paul | Johnson, Ray G. | St. Paul | Perry, C. G. | St. Paul |
| Dunn, J. N. | St. Paul | Johnson, T. H. | St. Paul | Peterson, V. N. | St. Paul |
| Dunne, Gerald P. | St. Paul | Jones, D. C. | St. Paul | Plondke, F. J. | St. Paul |
| Earl, George A. | St. Paul | Jones, E. M. | St. Paul | Prendergast, H. J. | St. Paul |
| Earl, Robert O. | St. Paul | Kadesky, David | St. Paul | Ramsey, W. R. | St. Paul |
| Edlund, G. | St. Paul | Kamman, Gordon R. | St. Paul | Richards, E. T. F. | St. Paul |
| Ely, O. S. | So. | Kannary, E. L. | St. Paul | Richardson, Harold E. | St. Paul |
| Emerson, E. C. | St. Paul | Kelly, John V. | St. Paul | Riggs, C. E. | St. Paul |
| Engdres, E. K. | St. Paul | Kelly, Paul H. | St. Paul | Ritchie, H. P. | St. Paul |
| Engberg, E. J. | St. Paul | Kennedy, W. A. | St. Paul | Rogers, J. T. | St. Paul |
| Ernest, G. C. | St. Paul | Kenny, H. F. | St. Paul | Rosenholtz, Burton | St. Paul |
| Eshelby, E. C. | St. Paul | Kesting, Herman | St. Paul | Rosenthal, Robert | St. Paul |
| Fahey, E. W. | St. Paul | King, George L. | St. Paul | Rothrock, J. L. | St. Paul |
| Ferguson, J. C. | St. Paul | King, Z. P. | St. Paul | Rothschild, H. J. | St. Paul |
| Flagstad, A. E. | St. Paul | Kistler, A. S. | St. Paul | Roy, Philemon | St. Paul |
| Fogarty, Charles W. | St. Paul | Klein, H. N. | St. Paul | Ruhberg, George N. | St. Paul |
| Foley, F. E. B. | St. Paul | Knauff, K. | St. Paul | Rutherford, W. C. | St. Paul |
| Fortney, A. C. | St. Paul | Kvitrud, G. | St. Paul | Ryan, John J. | St. Paul |
| Freeman, C. D. | St. Paul | Langenderfer, F. V. | St. Paul | Ryan, Mark E. | St. Paul |
| Fulton, J. F. | St. Paul | Larsen, C. L. | St. Paul | Satterlund, Victor | St. Paul |
| Gager, E. C. | St. Paul | Lax, Morris H. | St. Paul | Savage, F. J. | St. Paul |
| Garbrecht, Arthur | St. Paul | Leahy, B. | St. Paul | Schoch, R. B. | St. Paul |
| Gardiner, D. G. | St. Paul | Leavenworth, Richard O. | St. Paul | Schons, E. | St. Paul |
| Gardner, Walter P. | St. Paul | Leitch, Archibald | St. Paul | Schuld, F. C. | St. Paul |
| Geer, Everett K. | St. Paul | Leonard, Gilbert J. | St. Paul | Schulze, Albert G. | St. Paul |
| Gehlen, J. N. | St. Paul | Lepak, J. A. | St. Paul | Schwytzer, Arnold | St. Paul |
| Geist, George A. | St. Paul | Lerche, William | Cable, Wis. | Senkler, G. E. | St. Paul |
| Ghent, C. Harry | St. Paul | Lerwin, Bert | St. Paul | Setzer, H. J. | St. Paul |
| Ghent, M. M. | St. Paul | Lewis, W. W. | St. Paul | Shannon, W. Ray | St. Paul |
| Gillilan, J. S. | St. Paul | Lick, C. L. | St. Paul | Shellman, John L. | St. Paul |
| Ginsberg, Wm. | St. Paul | Little, W. J. | St. Paul | Shillington, M. A. | St. Paul |
| Goltz, E. V. | St. Paul | Lowe, Earl R. | So. St. Paul | Simon, B. F. | St. Paul |
| Grant, H. W. | St. Paul | Lowe, Thomas A. | So. St. Paul | Skinner, H. O. | St. Paul |
| Gratzek, Thomas | St. Paul | Lundholm, A. M. | St. Paul | Snyder, G. W. | St. Paul |
| Gruenhagen, Arnold P. | St. Paul | McBeath, Ewing C. | New York City | Sohlberg, Olof | St. Paul |
| Hagaman, Geo. K. | St. Paul | McCarthy, W. R. | St. Paul | Souster, B. B. | St. Paul |
| Hall, A. R. | St. Paul | McClanahan, J. H. | White Bear | Sprafka, J. M. | St. Paul |
| Hall, Henry H. | St. Paul | McClanahan, T. S. | White Bear | Stern, E. G. | St. Paul |
| Halper, Philip | St. Paul | McCloud, C. N. | St. Paul | Stern, O. W. | St. Paul |
| Hammes, E. M. | St. Paul | McLaren, Jeanette M. | St. Paul | Stevens, F. A. | Lake Elmo |
| Hammond, J. F. | St. Paul | McNevin, C. F. | St. Paul | Stewart, Alexander | St. Paul |
| Harmon, G. E. | St. Paul | Martineau, J. L. | St. Paul | Stierle, Adolph | St. Paul |
| Hartfiel, Wm. F. | St. Paul | Meyerding, E. A. | St. Paul | Stinnette, S. E. | St. Paul |
| Hartley, E. C. | St. Paul | Moga, John A. | St. Paul | Stolpestad, H. L. | St. Paul |
| Hauser, Victor | St. Paul | Mogilner, S. N. | St. Paul | Swanson, Edwin O. | St. Paul |
| Hawkins, V. J. | St. Paul | Molander, H. A. | St. Paul | Swanson, John A. | St. Paul |
| Heath, A. C. | St. Paul | Moquin, Marie A. | St. Paul | Swendson, J. J. | St. Paul |
| Heck, Wm. W. | St. Paul | Morrissey, F. B. | St. Paul | Taylor, H. L. | St. Paul |
| Hedenstrom, Frank G. | St. Paul | Mortenson, N. G. | St. Paul | Teisberg, C. B. | St. Paul |
| Hengstler, W. H. | St. Paul | Moynihan, T. J. | St. Paul | Tiber, L. J. | St. Paul |
| Hensel, C. N. | St. Paul | Muller, R. Theo | St. Paul | Tregilas, H. R. | So. St. Paul |
| Herrmann, Edgar T. | St. Paul | Myers, Thos. | St. Paul | Van Slyke, C. A. | St. Paul |
| Hesselgrave, S. S. | St. Paul | Naegeli, A. E. | St. Paul | Vonder Weyer, William | St. Paul |
| Hilger, A. W. | St. Paul | Neher, F. H. | St. Paul | Waas, Charles W. | St. Paul |
| Hilger, D. D. | St. Paul | Nelson, L. A. | St. Paul | Walker, R. E. | St. Paul |
| Hilger, L. A. | St. Paul | Nippert, H. T. | St. Paul | Warnock, R. W. | St. Paul |
| Hochfilzer, J. J. | St. Paul | Nordin, Charles G. | St. Paul | Warren, E. L. | St. Paul |
| Hoff, Alfred | St. Paul | Norris, Edgar H. | St. Paul | Welch, M. C. | St. Paul |
| Hoffman, Max H. | St. Paul | Nye, Katherine A. | St. Paul | Werner, O. S. | St. Paul |
| Holcomb, J. T. | St. Paul | Nye, Lillian | St. Paul | Weller, M. W. | St. Paul |
| Holcomb, O. W. | St. Paul | O'Brien, H. J. | St. Paul | Whitacre, J. C. | St. Paul |
| Holt, John E. | St. Paul | O'Connor, J. P. | St. Paul | Whitcomb, E. H. | St. Paul |
| Howard, W. S. | St. Paul | O'Connor, L. J. | St. Paul | White, J. S. | St. Paul |
| Hullsiek, H. E. | St. Paul | Oerting, Harry | St. Paul | Whitmore, Frank | St. Paul |
| Hullsiek, Richard | St. Paul | Ogden, Warner | St. Paul | Williams, Clayton | St. Paul |
| Hultkrans, Joel C. | St. Paul | Ohage, Justus | St. Paul | Williamson, Geo. A. | St. Paul |
| Hunt, H. E. | St. Paul | Ohage, Justus Jr. | St. Paul | Winnick, J. B. | St. Paul |
| Ide, A. W. | St. Paul | Olson, Chas. A. | St. Paul | Wold, K. C. | St. Paul |
| Ikedda, Kano | St. Paul | Ostergren, E. W. | St. Paul | Zimmermann, H. B. | St. Paul |

RED RIVER VALLEY MEDICAL SOCIETY

Kittson, Marshall, Polk, Roseau, Pennington, Red Lake, Norman and Mahnomon Counties.

Regular meetings, April, December and August.
Annual meeting, December.

| | | | | | | |
|-------------------|-------------------|-----------|-------------------|-------------------|-------------------|-------------------|
| Adkins, C. M. | President | Grygla | Dunlop, Alex. H. | Crookston | Nelson, H. E. | Crookston |
| Oppegaard, C. L. | Secretary | Crookston | Edstrom, Henry | Crookston | Norman, J. F. | Crookston |
| Adkins, C. M. | Grygla | | Engstrand, O. J. | Warren | Ohnstad, J. L. | McIntosh |
| Anderson, W. S. | Minneapolis | | Froehlich, H. W. | Thief River Falls | Oppegaard, C. L. | Crookston |
| Bernard, B. C. | Thief River Falls | | Griffin, P. J. | Fertile | Oppegaard, M. O. | Crookston |
| Bertleson, O. L. | Crookston | | Hanson, M. | Ada | Overend, K. V. | Hallock |
| Biedermann, Jacob | Thief River Falls | | Henny, W. H. | McIntosh | Paradis, W. G. | Crookston |
| Blegen, H. M. | Warren | | Hodgson, H. H. | Crookston | Rasmussen, C. C. | Fertile |
| Bowers, J. T. | Thief River Falls | | Hollands, W. H. | Fisher | Roy, J. A. | Red Lake Falls |
| Bratrud, O. Edw. | Warren | | Holmes, W. B. | Ada | Salt, Allen | Fosston |
| Bratrud, Theodor | Warren | | Holte, Halvor | Crookston | Shalen, A. W. | Hallock |
| Brosseau, J. E. | Argyle | | Kahala, Arthur | Crookston | Shedlov, A. | Fosston |
| Brown, L. L. | Crookston | | Kirk, G. P. | East Grand Forks | Shelland, J. T. | Ada |
| Button, A. J. | Greenbush | | Larson, Arnold L. | Duluth | Stratte, J. J. | Hallock |
| Delmore, J. L. | Roseau | | Leitch, Neil M. | Warroad | Stuurmanns, S. H. | Erskine |
| | | | Locken, O. E. | Crookston | Swedenberg, A. W. | Thief River Falls |
| | | | Lynde, Orrin | Thief River Falls | Turnbull, Robert | Fosston |
| | | | Melby, O. F. | Thief River Falls | Watson, N. M. | Red Lake Falls |
| | | | Mercil, Wm. F. | Crookston | Wattam, G. S. | Warren |
| | | | Morley, G. A. | Crookston | Wiltout, I. Geo. | Oslo |

*Deceased

REDWOOD-BROWN COUNTY MEDICAL SOCIETY

Regular meetings, at call of President.

Annual meeting, May.

| | |
|-------------------|---------|
| President | |
| Fritsche, L. A. | New Ulm |
| Secretary | |
| Meierding, Wm. A. | New Ulm |
| Abraham, Arden L. | Gibbon |
| Dubbe, F. H. | New Ulm |
| Fauth, Karl J. | Gaylord |
| Fritsche, Albert | New Ulm |
| Fritsche, L. A. | New Ulm |
| Gibbons, F. C. | Comfrey |

| | |
|----------------------|--------------|
| Goblirsch, A. P. | Sleepy Eye |
| Hammermeister, Theo. | New Ulm |
| Kovde, Rolf | Winthrop |
| Jamieson, Earl | Walnut Grove |
| Just, Herman | Lafayette |
| Kiefer, M. A. | Sleepy Eye |
| Kolset, Carl D. | Sanborn |
| Lindahl, Merlyn J. | Winthrop |
| Meierding, Wm. A. | New Ulm |
| Pederson, O. J. | Hanska |
| Peterson, R. A. | Vesta |
| Reineke, G. F. | New Ulm |

| | |
|-----------------------|-------------|
| Rothenburg, J. C. | Springfield |
| Saffert, Cornelius | New Ulm |
| Scherer, Roland G. | Morgan |
| Schoch, J. L. | New Ulm |
| Seifert, Otto J. | New Ulm |
| Shrader, J. S. | Springfield |
| Vogel, J. H. | New Ulm |
| Weiser, Geo. B. | New Ulm |
| Wellcome, J. W. B. | Sleepy Eye |
| Wickman, F. H. | Sleepy Eye |
| Wohlrahe, Clarence F. | Springfield |
| Wohlrahe, Edwin J. | Springfield |

RICE COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.

Annual meeting, December.

| | |
|-----------------|------------|
| President | |
| Murdoch, J. M. | Faribault |
| Secretary | |
| Plonske, C. J. | Faribault |
| Babcock, F. M. | Northfield |
| Backe, Edmund | Kenyon |
| Beede, Ethel R. | Faribault |
| Davis, F. U. | Faribault |
| Dungay, Neil S. | Northfield |
| Francis, D. W. | Morristown |
| Hanson, A. M. | Faribault |

| | |
|------------------|------------|
| Haessly, S. B. | Faribault |
| Haynes, A. L. | Faribault |
| Huxley, F. R. | Faribault |
| Kanne, C. W. | Faribault |
| Lende, Norman | Faribault |
| Lexa, F. J. | Lonsdale |
| McBroom, D. E. | Cambridge |
| Mayland, M. L. | Faribault |
| Meyer, P. F. | Faribault |
| Moses, J. | Northfield |
| Murdoch, J. M. | Faribault |
| Neseth, O. S. | Kenyon |
| Nickerson, W. S. | Faribault |

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|--------------------|------------|
| Plonske, C. J. | Faribault |
| Robilliard, C. M. | Faribault |
| Robilliard, W. H. | Faribault |
| Rumpf, C. W. | Faribault |
| Rumpf, W. H. | Faribault |
| Smith, P. A. | Faribault |
| Stewart, Gwendolyn | Faribault |
| Thorson, O. P. | Northfield |
| Traeger, C. A. | Faribault |
| Warren, F. S. | Faribault |
| Wilson, Warren | Northfield |
| Wilson, W. E. | Northfield |

ST. LOUIS COUNTY MEDICAL SOCIETY

St. Louis, Lake, Cook, and Carlton Counties.

Regular meetings, second Thursday each month.

Annual meeting, second Thursday, October.

| | |
|------------------|--------|
| President | |
| Elias, F. J. | Duluth |
| Secretary | |
| Fischer, M. McC. | Duluth |

| | |
|--------------------|---------------------|
| Abbott, Wm. P. | Duluth |
| Adams, B. S. | Hibbing |
| Alexander, C. E. | Duluth |
| Arminen, K. V. | Duluth |
| Armstrong, E. L. | Duluth |
| Athens, A. G. | Duluth |
| Ayres, G. T. | Ely |
| Bagley, W. R. | Duluth |
| Bakkila, H. E. | Duluth |
| Bardon, Richard | Duluth |
| Barney, L. A. | Duluth |
| Berde, G. L. | Duluth |
| Bergquist, K. E. | Duluth |
| Bianco, A. J. | Duluth |
| Birkland, O. N. | Hibbing |
| Blacklock, S. S. | Hibbing |
| Blakely, C. C. | Barnum |
| Boman, P. G. | Duluth |
| Boyer, S. H. | Duluth |
| Braden, A. J. | Duluth |
| Braverman, N. J. | Duluth |
| Bray, C. W. | Bwabik |
| Bullen, F. W. | Hibbing |
| Burns, R. L. | Two Harbors |
| Cantwell, W. F. | International Falls |
| Carstens, C. F. | Hibbing |
| Chapman, T. L. | Duluth |
| Cheney, E. L. | Duluth |
| Christensen, E. P. | Two Harbors |
| Clark, F. F. | Duluth |
| Clement, T. G. | Duluth |
| Collins, A. N. | Duluth |
| Collins, H. C. | Duluth |
| Cosgrove, J. H. | Duluth |
| Coventry, W. A. | Duluth |
| Davis, B. F. | Duluth |
| Doolittle, L. E. | Duluth |
| Drenning, F. C. | Duluth |
| Eckman, P. F. | Duluth |
| Ekblad, J. W. | Duluth |
| Eklund, W. J. | Duluth |
| Elias, F. J. | Duluth |
| Eppard, R. M. | Cloquet |
| Estrem, T. A. | Hibbing |
| Fawcett, Keith R. | Duluth |
| Ferriera, G. J. | Duluth |
| Fischer, M. McC. | Duluth |
| Fleming, James | Cloquet |
| Forbes, R. S. | Duluth |
| French, H. S. | Duluth |
| Gillespie, M. G. | Duluth |

*Deceased

| | |
|----------------------|-------------------|
| Gillespie, N. H. | Duluth |
| Giroux, A. A. | Duluth |
| Gowan, L. R. | Duluth |
| Graham, David | Duluth |
| Graham, R. D. | Duluth |
| Graham, Robert | Duluth |
| Graves, W. N. | Duluth |
| Grawn, F. A. | Duluth |
| Hall, A. | Virginia |
| Haney, C. L. | Duluth |
| Hansen, R. | Buhl |
| Harris, C. N. | Chisholm |
| Hatch, W. E. | Duluth |
| Hathaway, S. J. | Proctor |
| Hayes, M. F. | Nashwaak |
| Haynes, M. H. | Duluth |
| Heimark, O. E. | Duluth |
| Hilding, Anderson C. | Duluth |
| Hill, J. E. | Duluth |
| Hirschboeck, F. J. | Duluth |
| Hirschfield, M. S. | Duluth |
| Holderman, J. W. | Duluth |
| Jacobson, C. | Chisholm |
| Jensen, T. J. | Duluth |
| Kerlan, Milton | Philadelphia, Pa. |
| Keyes, C. R. | Duluth |
| Kiesling, I. H. | Nashwaak |
| Klein, Harry | Duluth |
| Kliman, F. E. | Duluth |
| Knapp, F. N. | Duluth |
| Kohlbr, C. O. | Duluth |
| Kraft, Peter | Duluth |
| Krantz, C. I. | Duluth |
| Kuth, J. R. | Duluth |
| Laird, A. T. | Nopeming |
| Lamont, John C. | Nopeming |
| Lenont, C. B. | Virginia |
| Lepak, F. J. | Duluth |
| Litman, S. N. | Duluth |
| Loebourrow, E. H. | Keewatin |
| Lum, C. E. | Ely |
| McCarthy, P. D. | Duluth |
| McComb, C. F. | Duluth |
| McCoy, Mary | Duluth |
| McDaniel, S. P. | Mountain Iron |
| McDonald, A. L. | Duluth |
| McGiffert, E. N. | Duluth |
| McHaffie, O. L. | Duluth |
| McNutt, J. R. | Minneapolis |
| MacFarlane, P. H. | Chisholm |
| MacRae, G. C. | Duluth |
| Magie, W. H. | Duluth |
| Magney, F. H. | Duluth |
| Manley, J. R. | Duluth |
| Martin, E. T. | Duluth |
| Martin, W. C. | Duluth |
| Mayne, R. M. | Duluth |
| Merriman, L. L. | Duluth |
| Moe, R. J. | Duluth |
| Moe, Thomas | Moose Lake |

| | |
|-------------------|-------------------|
| Monroe, P. B. | Soudan |
| Mooney, Leo P. | Marble |
| More, C. W. | Eveleth |
| Morsman, L. W. | Hibbing |
| Morss, C. R. | Zumbrota |
| Murray, D. D. | Duluth |
| Nelson, E. H. | Chisholm |
| Nelson, R. L. | Duluth |
| Nicholson, M. A. | Duluth |
| Olson, Albert E. | Duluth |
| Oredson, O. A. | Duluth |
| Parker, O. W. | Ely |
| Pennie, D. F. | Duluth |
| Perley, A. E. | Philadelphia, Pa. |
| Power, J. E. | Duluth |
| Raadquist, C. S. | Hibbing |
| Raiter, F. W. S. | Cloquet |
| Raiter, R. F. | Cloquet |
| Rapp, E. W. | Duluth |
| Robinson, J. M. | Duluth |
| Rood, D. C. | Duluth |
| Rowe, O. W. | Duluth |
| Rowles, E. K. | Coleraine |
| Ruby, F. McK. | Hibbing |
| Rudie, P. S. | Duluth |
| Ryan, W. J. | Duluth |
| St. Clair, G. G. | Ft. Snelling |
| Scherer, C. A. | Duluth |
| Schroeder, C. H. | Duluth |
| Seashore, D. E. | Duluth |
| Shapiro, E. Z. | Duluth |
| Shaw, A. W. | Buhl |
| Sinamack, Andrew | Hibbing |
| Slyfield, F. F. | Duluth |
| Smith, C. M. | Duluth |
| Smith, E. K. | Duluth |
| Spicer, F. W. | Duluth |
| Strathern, M. L. | Duluth |
| Strobel, W. G. | Duluth |
| Stuart, A. B. | Cloquet |
| Sukeforth, L. A. | Duluth |
| Sutherland, H. N. | Ely |
| Swenson, A. O. | Duluth |
| Taylor, C. W. | Duluth |
| Tibbetts, M. H. | Duluth |
| Tildner, D. L. | Duluth |
| Tuohy, E. L. | Duluth |
| Urberg, S. E. | Duluth |
| Vercellini, C. E. | Duluth |
| Vivian, R. S. | Hibbing |
| Walker, A. E. | Duluth |
| Webber, E. E. | Duluth |
| Weber, M. L. | Duluth |
| Webster, H. E. | Duluth |
| Weirick, H. R. | Hibbing |
| Wheeler, D. W. | Duluth |
| Wilkinson, Stella | Duluth |
| Winter, J. A. | Duluth |
| Young, T. O. | Duluth |
| Young, V. A. | Duluth |
| Zlatovski, M. L. | Duluth |

SCOTT-CARVER COUNTY MEDICAL SOCIETY

Regular meetings, every two months in Winter—Every month in Summer.

Annual meeting, in July.

President
Westerman, F. C. _____ Montgomery

Secretary
Simons, B. H. _____ Chaska

Bohland, F. J. _____ Belle Plaine
Buck, F. H. _____ Shakopee
Cervenka, C. F. _____ New Prague
Eklund, E. J. _____ Norwood
Emmerson, W. S. _____ Mayer

Fisher, H. P. _____ Shakopee
Fisher, P. M. _____ Shakopee
Halgren, H. A. _____ Watertown
Hebeisen, M. B. _____ Carver
Henriksen, H. G. _____ Elko
Jurgens, H. M. _____ Belle Plaine
Kolars, J. J. _____ Le Sueur Center
McKeon, James _____ St. Paul
Maertz, W. F. _____ New Prague
Nagel, H. D. _____ Waconia
Novak, E. E. _____ New Prague

Olson, C. J. _____ Belle Plaine
Ormond, D. _____ Waconia
Phillips, W. H. _____ Jordan
Reiter, H. W. _____ Shakopee
Schneider, H. A. _____ Jordan
Simons, B. H. _____ Chaska
Westerman, A. E. _____ Montgomery
Westerman, F. C. _____ Montgomery
Wunder, H. E. _____ Shakopee

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

Pipestone, Rock, Murray, Nobles, Cottonwood and Jackson Counties.

Annual meeting, November.

President
Patterson, W. E. _____ Westbrook

Secretary
McKeown, E. G. _____ Pipestone

Arnold, E. W. _____ Adrian
Basinger, H. P. _____ Windom
Basinger, Harvey R. _____ Mountain Lake
Benjamin, McBroome _____ Jasper
Benjamin, W. G. _____ Pipestone
Bolenkamp, F. W. _____ Luverne
Bong, J. H. _____ Jasper
Brown, A. H. _____ Pipestone
Chadbourne, A. G. _____ Heron Lake
Cress, P. J. _____ Ellsworth
DeBoer, H. _____ Edgerton
Ditmeier, L. M. G. _____ Jasper
Dolan, C. P. _____ Worthington

Doms, H. C. _____ Slayton
Dudley, J. H. _____ Windom
Golden, C. M. _____ Tyler
Halloran, Walter _____ Jackson
Hilger, J. M. _____ Iona
Hitchings, W. S. _____ Lakefield
Johnson, Ellsworth _____ Rochester
Kelling, Louis F. _____ Lakefield
Kendahl, A. M. _____ Jasper
Kilbride, E. A. _____ Worthington
Lebens, J. H. _____ Lismore
Lowe, Thos. _____ Pipestone
McCreia, James _____ Fulda
McKeown, E. G. _____ Pipestone
Maitland, D. P. _____ Jackson
Manson, F. M. _____ Worthington
Mork, B. O. _____ Worthington
Nusbaum, D. H. _____ Jackson
Patterson, W. E. _____ Westbrook

Piper, Wm. A. _____ Mountain Lake
Portmann, W. C. _____ Jackson
Rose, J. T. _____ Lakefield
Schutz, Elmer S. _____ Windom
Sherman, C. L. _____ Luverne
Slater, S. A. _____ Worthington
Smallwood, J. T. _____ Worthington
Sogge, L. R. _____ Windom
Stanley, C. R. _____ Worthington
Taylor, Wm. J. _____ Pipestone
Thorsen, E. O. _____ Luverne
Tiedemann, E. J. _____ Adrian
Tofte, Josephine _____ Dawson
Waller, J. D. _____ Wilmont
Watson, Sydney _____ Worthington
Williams, A. B. _____ St. Paul
Williams, Leon A. _____ Slayton
Wright, C. O. _____ Luverne

STEARNS-BENTON COUNTY MEDICAL SOCIETY

Regular meetings, third Thursday of each month.

Annual meeting, third Thursday of April.

President
Meyers, A. A. _____ Melrose

Secretary
McDowell, Jno. P. _____ St. Cloud

Beuning, J. B. _____ Albany
Boehm, J. C. _____ St. Cloud
Brigham, C. F. _____ St. Cloud
Buscher, Julius _____ St. Cloud
Clark, H. B. _____ St. Cloud
Du Bois, J. A. _____ Sauk Center
Du Bois, J. F. _____ Sauk Center
Engstrom, G. F. _____ Belgrade
Fleming, T. N. _____ St. Cloud
Freeman, W. L. _____ St. Cloud
Friesleben, Wm. _____ Sauk Rapids
Gelz, Jno. J. _____ St. Cloud

Goehrs, H. W. _____ St. Cloud
Haberman, E. _____ Oakis
Halenbeck, Philip Luther _____ St. Cloud
Hemstead, Werner _____ St. Cloud
Holdridge, Geo. _____ Foley
Johnson, Walford _____ Sauk Center
Jones, R. N. _____ St. Cloud
Kern, M. J. _____ St. Cloud
Kingsbury, E. M. _____ Clearwater
Kohler, D. W. _____ St. Joseph
Koop, S. H. _____ Richmond
Kuhlman, Aug. _____ Melrose
Lewis, C. B. _____ St. Cloud
Libert, J. N. _____ St. Cloud
McDowell, Jno. P. _____ St. Cloud
McKibben, H. E. _____ St. Cloud
Mahowald, A. _____ Albany

Meyer, A. A. _____ Melrose
Haberman, A. F. _____ Sauk Center
Myre, C. R. _____ Paynesville
Rathbun, A. M. _____ Rice
Rathbun, C. A. _____ St. Cloud
Richards, W. B. _____ St. Cloud
Ridgway, Alexander _____ Belgrade
Rumpf, Wm. H., Jr. _____ St. Cloud
Schatz, F. J. _____ St. Cloud
Sherwood, Geo. E. _____ Kimball
Stangel, Fred _____ St. Cloud
Stangel, Philip E. _____ St. Cloud
Sutton, C. S. _____ St. Cloud
Sweetman, R. H. _____ Sauk Center
Townsend, De Wayne _____ Brooten
Wenner, W. T. _____ St. Cloud
Zachman, A. H. _____ Melrose

STEELE COUNTY MEDICAL SOCIETY

Regular meetings, odd months, second Tuesday.

Annual meeting, November.

President
Nelson, Ernest J. _____ Owatonna

Secretary
Hart, Alfred B. _____ Owatonna

Ertel, E. O. _____ Ellendale
Gault, C. C. _____ Owatonna
Hart, Alfred B. _____ Owatonna
McIntyre, John A. _____ Owatonna
Melby, Benedik _____ Blooming Prairie

Nelson, Ernest J. _____ Owatonna
Senn, E. W. _____ Owatonna
Smersh, J. F. _____ Owatonna
Stewart, A. B. _____ Owatonna

UPPER MISSISSIPPI MEDICAL SOCIETY

Aitkin, Crow Wing, Morrison, Cass, Todd, Wadena, Clearwater, Koochiching,

Hubbard, Itasca and Beltrami Counties.

Regular meetings, Spring, Fall, Summer.

Annual meeting, January.

President
Badeaux, G. I. _____ Brainerd

Secretary
Kum, F. F. _____ Wadena

Agnew, Allen T. _____ International Falls
Allen, F. H. _____ Staples
Badeaux, G. I. _____ Brainerd
Beise, R. A. _____ Brainerd
Borgerson, A. H. _____ Hewitt
Burns, Herbert A. _____ Ah-gwah-ching
Christie, G. R. _____ Long Prairie
Christie, R. L. _____ Long Prairie
Corrigan, J. E. _____ Spooner
Craig, C. C. _____ International Falls

Davis, Thayer C. _____ Wadena
Davis, L. Thomas _____ Wadena
Forrest, C. G. _____ Clearbrook
Frost, Harry T. _____ Wadena
Gaalaas, A. P. _____ Wadena
Garlock, A. V. _____ Bemidji
Garlock, D. H. _____ Bemidji
Ghostley, Mary C. _____ Puposky
Grogan, J. S. _____ Wadena
Grose, Fredk. N. _____ Clarissa
Groschup, Theo. P. _____ Bemidji
Hawkinson, L. F. _____ Brainerd
Hawkinson, J. P. _____ Crosby
Healy, R. T. _____ Pierz
Holst, C. F. _____ Little Falls
Holst, J. B. _____ Little Falls

House, Z. E. _____ Cass Lake
Houston, C. A. _____ Park Rapids
Jacobson, David J. _____ Blackduck
Johnson, E. W. _____ Bemidji
Kelly, B. W. _____ Aitkin
Kenyon, Paul _____ Wadena
Kum, Frederick F. _____ Wadena
Larson, L. M. _____ Oak Terrace
Laughlin, J. T. _____ Grey Eagle
McHugh, Roderica F. _____ Aitkin
Marcum, E. H. _____ Bemidji
Miller, W. A. _____ New York Mills
Mower, Ralph E. _____ Bemidji
Nelson, Nesmith _____ Brainerd
Ortman, John W. _____ Pierz
Osborn, Burt F. _____ International Falls

Parrott, B. W. Long Prairie
Pierce, Chas. H. Wadena
Roberts, L. M. Little Falls
Shannon, S. S. Crosby
Simons, Edwin J. Swanville
Smith, B. A. Crosby

Smith, E. H. Bemidji
Strader, E. L. Deerwood
Thabes, John Alois, Jr. Brainerd
Thabes, J. A., Sr. Brainerd
Trimbo, Jos. H. Menahga
Van Valkenberg, B. F. Long Prairie

Van Valkenberg, F. W. Long Prairie
Watson, A. M. Royalton
Watson, John D. Holdingford
Will, W. W. Bertha

WABASHA COUNTY MEDICAL SOCIETY

Annual meeting, first Thursday after first Monday in July.

Frost, Russell H. President Wabasha
Wilson, W. F. Secretary Lake City

Bayley, E. C. Lake City
Bowers, H. E. Lake City
Cochrane, W. J. Lake City
Collins, J. S. Wabasha
Dempsey, D. P. Kellogg
Fleischhauer, D. S. Wabasha

Frost, R. H. Wabasha
Radabaugh, R. C. Hastings
Replogle, W. H. Wabasha
Slocumb, J. A. Plainview
Stryker, W. B. Plainview
Wilson, W. F. Lake City

WASECA COUNTY MEDICAL SOCIETY

Annual meeting, December.

O'Hara, J. J. President Janesville
Saliterman, B. I. Secretary Janesville

Bernstein, Wm. C. New Richland
Gallagher, B. J. Waseca
Hagen, H. O. New Richland
Leopard, B. A. New Richland
McIntire, H. M. Waseca

O'Hara, J. J. Janesville
Saliterman, B. I. Janesville
Swartwood, F. A. Waseca
Swenson, O. J. Waseca

WASHINGTON COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday of month.

Annual meeting, second Tuesday in December.

Humphrey, W. R. President Stillwater
Boleyn, E. S. Secretary Stillwater
Boleyn, E. S. Stillwater

Combacker, L. C. Fergus Falls
Haines, J. H. Stillwater
Hewson, Wilfred J. Stillwater
Humphrey, W. R. Stillwater
Josewski, R. J. Stillwater
Kalinoff, D. Stillwater
Poirier, J. A. Forest Lake

Sherman, Carnot H. Philadelphia, Pa.
Strand, E. Bayport
Stuhr, J. W. Stillwater
Thompson, V. C. Marine-on-St. Croix
Von Meier, H. Stillwater

WATONWAN COUNTY MEDICAL SOCIETY

Regular meetings, on call.

Annual meeting, December.

Bregel, F. L. President St. James
Grimes, H. B. Secretary Madelia

Bergman, Oscar B. St. James
Bregel, Fred L. St. James
Grimes, Henry B. Madelia
Hagen, Olie E. Butterfield

Haynes, B. H. Butterfield
McCarthy, W. J. Madelia
Thompson, Albert St. James

WEST CENTRAL MINNESOTA MEDICAL SOCIETY

Big Stone, Traverse, Pope and Stevens Counties.

Regular meetings, October, January and June.

Annual meeting, October.

Linde, H. President Cyrus
Bolsta, Chas. Secretary Ortonville
Arneson, A. I. Starbuck
Bergen, Otto. Clinton
Bolsta, Charles Ortonville
Caine, Chas. E. Morris
Christianson, C. R. Starbuck

Cumming, J. F. Morris
Doleman, N. F. Tintah
Eberlin, A. E. Glenwood
Else, J. R. Glenwood
Ewing, C. F. Wheaton
Fitzgerald, E. T. Morris
Gibbon, L. L. Lowry
Giesen, A. F. Starbuck
Judge, W. T. Graceville
Karn, B. R. Ortonville
Leland, J. T. Herman

Leuty, Amos Morris
Lindberg, A. L. Wheaton
Linde, H. Cyrus
McIver, B. A. Lowry
O'Donnell, D. M. Ortonville
Oliver, C. I. Graceville
Piercion, C. M. Wheaton
Ransom, M. L. Hancock
Shelver, H. J. Ortonville
Weir, J. D. Browns Valley

WINONA COUNTY MEDICAL SOCIETY

Regular meetings, January, April, July and October.

Annual meeting, January.

Walker, G. H. President Winona
Steiner, I. W. Secretary Winona
Benoit, F. T. Winona
Clay, F. H. St. Charles
Fetter, Mary. Winona
Heise, W. F. C. Winona

Keyes, E. D. Winona
Keyes, J. D. Winona
Lichtenstein, Hans Winona
Lindsay, W. V. Winona
McDonnell, C. H. Winona
McLaughlin, E. M. Winona
Mattison, P. A. Winona
Meinert, A. E. Winona
Nauth, W. W. Winona
Neumann, C. A. Lewiston

Page, R. L. St. Charles
Pritchard, D. B. Winona
Risser, E. D. Winona
Robbins, C. P. Winona
Satterlie, H. W. Lewiston
Schaefer, Samuel. Winona
Steiner, I. W. Winona
Tweedy, G. J. Winona
Walker, G. H. Winona
Wilson, R. H. Winona

WRIGHT COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.

Annual meeting, October.

Norris, Geo. H. President Annandale
Catlin, J. J. Secretary Buffalo
Catlin, John J. Buffalo

Ellison, Frank E. Monticello
Freed, O. T. R. Kokato
Harriman, L. Howard Lake
Johnson, V. P. Delano
Klaveness, E. St. Paul
Lee, J. L. Watertown
Norris, G. H. Annandale

Peterson, O. L. Kokato
Phillips, A. E. Delano
Ridgway, A. M. Annandale
Roholt, C. L. Waverly
Rousseau, V. Maple Lake
Swezey, B. F. Buffalo

ALPHABETICAL ROSTER

| | | | | | |
|------------------------|---------------------|-----------------------|-------------------|------------------------|-------------------|
| Aanes, A. M. | Red Wing | Balcome, F. E. | St. Paul | Bonesteel, Henry T. S. | Rochester |
| Abbott, Walter D. | Rochester | Baldwin, A. E. | Houston | Bong, J. H. | Jasper |
| Abbott, Wm. P. | Duluth | Balfour, D. C. | Rochester | Bonta, M. B. | Rochester |
| Aborn, W. H. | Hawley | Ball, C. R. | St. Paul | Booth, A. E. | Minneapolis |
| Abraham, Arden L. | Gibson | Ball, R. G. | Rochester | Boothby, Wm. | Rochester |
| Adams, B. S. | Hibbing | Bannick, Edwin G. | Rochester | Boquist, E. T. W. | Minneapolis |
| Adams, R. C. | Bird Island | Barber, J. P. | Minneapolis | Boquist, Harold S. | Minneapolis |
| Adams, R. T. | Mantorville | Barborka, C. J. | Rochester | Boreen, C. A. | Minneapolis |
| Adams, S. Franklin | Rochester | Bardon, Richard | Duluth | Borg, Joseph F. | St. Paul |
| Adkins, C. M. | Grygla | Bargen, J. Arnold | Rochester | Borgerson, A. H. | Hewitt |
| Adson, A. W. | Rochester | Barker, Nelson W. | Rochester | Borgeson, Egbert J. | Minneapolis |
| Affeldt, Daniel E. | Kasson | Barnes, A. R. | Rochester | Bossingham, O. N. | Lake Benton |
| Agnew, Allen T. | International Falls | Barney, L. A. | Duluth | Bottolfsen, B. T. | Moorhead |
| Ahrens, A. E. | St. Paul | Barron, Moses | Minneapolis | Bouma, L. R. | St. Paul |
| Ahrens, A. H. | St. Paul | Barry, L. W. | St. Paul | Bouman, H. A. | Minneapolis |
| Ahrens, R. S. | Minneapolis | Barness, Nellie | St. Paul | Bowers, H. E. | Lake City |
| Aitkens, H. B. | LeSueur Center | Bartels, E. C. | Rochester | Bowers, J. T. | Thief River Falls |
| Akster, Ward | Marshall | Barton, E. R. | Minneapolis | Bowing, H. H. | Rochester |
| Alberts, Max W. | St. Paul | Basinger, H. P. | Windom | Boyer, S. H. | Duluth |
| Alden, J. F. | St. Paul | Basinger, Harvey R. | Mountain Lake | Boynton, Ruth | Minneapolis |
| Aldes, Harry | St. Paul | Bass, G. W. | Minneapolis | Boysen, H. | Welcome |
| Aldrich, F. H. | Bellevue | Bayard, Harry F. | Rochester | Boysen, Peter | Pelican Rapids |
| Alexander, Clifford E. | Duluth | Baxter, S. H. | Minneapolis | Braschi, Wm. F. | Rochester |
| Alexander, F. H. | St. Paul | Bayley, E. C. | Lake City | Brabec, F. J. | Perham |
| Aling, C. P. | Minneapolis | Readie, W. D. | Cannon Falls | Brabec, P. F. | Perham |
| Allan, Frank N. | Rochester | Beals, Hugh | St. Paul | Bracken, H. M. | Claremont, Calif. |
| Allen, A. W. | Austin | Beard, Archie H. | Minneapolis | Braden, A. J. | Duluth |
| Allen, Chas. C. | Austin | Beard, R. O. | Minneapolis | Bradley, J. W. | Rochester |
| Allen, Edgar V. | Rochester | Beaver, Meredith G. | Rochester | Brand, G. D. | St. Paul |
| Allen, F. H. | Staples | Bedford, E. W. | Minneapolis | Brand, W. A. | Redwood Falls |
| Allen, H. W. | Minneapolis | Beede, Ethel R. | Faribault | Branham, D. S. | Albert Lea |
| Allen, Mason | St. Paul | Ehmler, Fred W. | Appleton | Branton, A. F. | Willmar |
| Allen, Roy W. | Rochester | Beise, R. A. | Brainerd | Branton, B. J. | Willmar |
| Allen, W. A. | Rochester | Beiswanger, R. H. | Wykoff | Bratrud, A. F. | Minneapolis |
| Allison, R. G. | Minneapolis | Bell, C. C. | St. Paul | Bratrud, O. Edward | Warren |
| Almquist, H. E. | Minneapolis | Bell, E. T. | Minneapolis | Bratrud, Theodor | Warren |
| Altnow, Hugo O. | Minneapolis | Bell, J. W. | Minneapolis | Braverman, N. J. | Duluth |
| Alvarez, Walter C. | Rochester | Belote, G. B. | Caledonia | Bray, C. W. | Biwabik |
| Amberg, Samuel | Rochester | Benedict, E. E. | Minneapolis | Bray, E. R. | St. Paul |
| Anderson, A. E. | Minneapolis | Benedict, W. L. | Rochester | Bregel, Fred L. | St. James |
| Anderson, Arnt G. | Minneapolis | Benep, L. M. | St. Paul | Brigham, C. F. | St. Cloud |
| Anderson, Arnold S. | St. Paul | Benham, E. W. | Mankato | Brigham, Frank | Watkins |
| Anderson, C. M. | Rochester | Benjamin, A. E. | Minneapolis | Brimhall, J. B. | St. Paul |
| Anderson, David D. | Minneapolis | Benjamin, M. B. | Jasper | Broders, A. C. | Rochester |
| Anderson, E. W. | Rochester | Benjamin, W. G. | Pipestone | Brodie, Walter D. | St. Paul |
| Anderson, Edward D. | Minneapolis | Benn, F. G. | Minneapolis | Broker, W. S. | Battle Lake |
| Anderson, Ernest R. | Minneapolis | Bennion, P. H. | St. Paul | Brooks, D. F. | St. Paul |
| Anderson, Frank J. | Minneapolis | Benoit, F. T. | Winona | Brooks, G. F. | St. Paul |
| Anderson, J. K. | Minneapolis | Bentley, Norman P. | St. Paul | Brousseau, J. E. | Argyle |
| Anderson, Mark J. | Rochester | Berdez, G. L. | Duluth | Brown, A. E. | Rochester |
| Anderson, Norman E. | Harmony | Bergan, Otto | Clinton | Brown, A. H. | Pipestone |
| Anderson, R. E. | Willmar | Bergh, L. N. | Montevideo | Brown, C. B. | Minneapolis |
| Anderson, Reuben M. | Rochester | Bergheim, M. C. | Hawley | Brown, Edgar D. | Minneapolis |
| Anderson, Richard S. | Rochester | Berglund, Hilding | Minneapolis | Brown, Edw. J. | Minneapolis |
| Anderson, S. H. | Red Wing | Bergman, O. B. | St. James | Brown, G. E. | Rochester |
| Anderson, Silas C. | Minneapolis | Bergquist, K. E. | Duluth | Brown, John C. | St. Paul |
| Anderson, W. S. | Minneapolis | Berkman, D. M. | Rochester | Brown, Lyle L. | Crookston |
| Andrews, J. W. | Mankato | Berkman, John M. | Rochester | Brown, P. W. | Rochester |
| Andrews, R. N. | Mankato | Bernard, B. C. | Thief River Falls | Brown, S. E. | St. Paul |
| Andrews, R. S. | Minneapolis | Bernstein, Wm. C. | New Richland | Bruner, Julian M. | Rochester |
| Annis, H. B. | Minneapolis | Berrisford, Paul D. | St. Paul | Brunsting, Louis A. | Rochester |
| Archibald, Frank M. | Mahnomen | Bertelson, O. L. | Crookston | Buck, Fred H. | Shakopee |
| Arends, A. L. | Wright | Bessesen, A. N., Sr. | Minneapolis | Buie, L. A. | Rochester |
| Arey, H. C. | Excelsior | Bessesen, Al. N., Jr. | Minneapolis | Bulkley, Kenneth | Minneapolis |
| Arminen, K. V. | Duluth | Bessesen, Daniel H. | Minneapolis | Bullen, F. W. | Hibbing |
| Armstrong, E. L. | Duluth | Bessesen, W. A. | Minneapolis | Bumpus, H. C. | Rochester |
| Armstrong, J. M. | St. Paul | Beuning, J. B. | Albany | Bumpus, Laurin Dudley | Rochester |
| Arneson, A. I. | Starbuck | Bianco, A. J. | Duluth | Burch, F. E. | St. Paul |
| Arnold, Duma C. | Minneapolis | Biedermann, Jacob | Thief River Falls | Burhead, G. H. | St. Paul |
| Arnold, E. W. | Adrian | Bigelow, C. E. | Dodge Center | Burke, Charles F. | Rochester |
| Arnquist, A. S. | St. Paul | Binger, H. E. | St. Paul | Burnap, W. L. | Fergus Falls |
| Arnson, J. M. | Benson | Binger, Melvin W. | Rochester | Burns, F. W. | St. Paul |
| Arvidson, C. G. | Minneapolis | Birkeland, Ivar W. | Rochester | Burns, H. D. | Albert Lea |
| Athens, A. G. | Duluth | Birkland, O. N. | Hibbing | Burns, Herbert A. | Ah-gwah-ching |
| Aune, Martin | Minneapolis | Birnberg, T. L. | St. Paul | Burns, M. A. | Milan |
| Aurand, W. H. | Minneapolis | Black, Wm. | Mankato | Burns, R. L. | Two Harbors |
| Aurelius, J. Richards | St. Paul | Blacklock, S. S. | Hibbing | Burns, R. M. | St. Paul |
| Avery, J. Fowler | Minneapolis | Blake, Jas. L. | Hopkins | Burton, C. G. | St. Paul |
| Ayres, G. T. | Ely | Blakely, C. C. | Barnum | Buscher, Julius | St. Cloud |
| Babcock, F. M. | Northfield | Blanchard, H. G. | Fairmont | Busher, H. | St. Paul |
| Backe, Edmund | Kenvon | Blaustone, Henry H. | Minneapolis | Butler, John | Minneapolis |
| Bacon, Donald K. | San Diego, Cal. | Blegen, H. M. | Warren | Button, A. J. | Greenbush |
| Bacon, Knox | St. Paul | Bliss, Theodore L. | Rochester | Butturff, C. R. | Freeborn |
| Bacon, L. C. | St. Paul | Blumenthal, Jacob | Minneapolis | Butz, J. A. | Monterey |
| Bacon, R. S. | Montevideo | Bock, R. A. | St. Paul | Butzer, John A. | Mankato |
| Badeaux, G. I. | Brainerd | Bockman, M. W. H. | Minneapolis | Buzzelle, L. K. | Minneapolis |
| Bagley, W. R. | Duluth | Boe, A. M. | Minneapolis | | |
| Bailey, H. B. | Ceylon | Boeck, William C. | Rochester | | |
| Bain, Charles G. | Rochester | Boeckmann, Egil | St. Paul | | |
| Baken, Melvin P. | Minneapolis | Boehm, I. C. | St. Cloud | | |
| Baker, A. C. | Fergus Falls | Boesel, R. J. | Rochester | | |
| Baker, Alfred T. | Minneapolis | Bofenkamp, F. W. | Luverne | | |
| Baker, E. L. | Minneapolis | Bohland, E. H. | St. Paul | | |
| Baker, Harry | Hayfield | Bohland, F. J. | Belle Plaine | | |
| Baker, Loe | Minneapolis | Bohling, B. S. | Sandstone | | |
| Bakke, O. H. | Minneapolis | Bole, R. S. | Stillwater | | |
| Bakila, Henry | Duluth | Boleyn, E. S. | Ortonville | | |
| | | Bolsta, Chas. | Duluth | | |
| | | Roman, P. G. | Mapleton | | |
| | | Bomberger, C. B. | | | |

*Deceased

Camp, John D. Rochester
Camp, W. E. Minneapolis
Campbell, J. E. South St. Paul
Campbell, L. M. Minneapolis
Campbell, Orwood J. Minneapolis
Campbell, Robert. Minneapolis
Canfield, Wayne W. Houston
Cannon, Harry. St. Paul
Cantwell, W. F. International Falls
Cardle, Archibald E. Minneapolis
Carey, Jas. B. Minneapolis
Carlaw, C. M. Minneapolis
Carmen, J. E. Detroit Lakes
Carmichael, Hugh T. Rochester
Caron, Robert P. Minneapolis
Carroll, Wm. C. St. Paul
Carstens, C. F. Hibbing
Carter, Fred G. St. Paul
Cathcart, E. P. Rochester
Cathlin, John J. Buffalo
Cavanor, F. J. Minneapolis
Cervenka, Charles F. New Prague
Chadbourne, A. G. Heron Lake
Chamberlain, H. E. Minneapolis
Chambers, W. C. Blue Earth
Chapman, C. B. Rochester
Chapman, T. L. Duluth
Chatterton, C. C. St. Paul
Chelen, S. J. Minneapolis
Cheney, E. L. Duluth
Cherry, Chas. H. Minneapolis
Chesley, A. J. Minneapolis
Childrey, J. H. Rochester
Christensen, E. P. Two Harbors
Christensen, Eli E. Rochester
Christenson, C. R. Starbuck
Christiansen, A. G. St. Paul
Christianson, H. W. Rochester
Christie, G. R. Long Prairie
Christie, R. L. Long Prairie
Christison, J. T. St. Paul
Chumley, Charles L. Rochester
Chunn, Stanley S. Lake Wilson
Clark, F. F. Duluth
Clark, H. B. St. Cloud
Clark, H. S. Minneapolis
Clark, T. C. Minneapolis
Clay, F. H. St. Charles
Claydon, Donald R. Red Wing
Claydon, L. E. Red Wing
Clement, J. B. Lester Prairie
Clement, T. G. Duluth
Coakley, Leo P. Rochester
Cobb, S. G. St. Paul
Cobb, Willis F. Lake City
Cochrane, W. J. Oak Terrace
Cohen, Sumner. St. Paul
Colby, Woodard. St. Paul
Cole, H. B. Redwood Falls
Cole, Wallace H. St. Paul
Coleman, F. B. Austin
Coleman, Julian Harwood. Rochester
Collins, A. N. Duluth
Collins, Donald C. Rochester
Collins, H. C. Duluth
Collins, J. S. Wabasha
Colvin, A. R. St. Paul
Combacker, L. C. Fergus Falls
Comfort, Mandred W. Rochester
Constock, A. E. St. Paul
Condit, W. H. Minneapolis
Conley, Alva A. Cannon Falls
Conner, H. M. Rochester
Conner, Wm. H. Minneapolis
Connor, C. E. St. Paul
Cook, Henry W. Minneapolis
Cook, Paul B. St. Paul
Cooke, Harry Hamilton. Rochester
Cooney, H. C. Princeton
Cooper, F. G. Rochester
Cooper, M. D. Winnebago
Cooperman, H. O. Minneapolis
Copeland, M. M. Rochester
Corbett, J. Frank. Minneapolis
Corniea, A. D. Minneapolis
Corr, W. P. Rochester
Corrigan, J. E. Spooner
Cosgriff, J. A. Olivia
Cosgrove, J. H. Duluth
Cosman, E. O. Minneapolis
Counselor, Virgil S. Rochester
Countryman, Roger S. St. Paul
Covell, W. W. St. Peter
Coventry, W. A. Duluth
Cowern, E. W. North St. Paul
Crafts, Leo M. Minneapolis
Craig, C. C. International Falls
Craig, Winchell McK. Rochester
Cranmer, Richard R. Minneapolis
Creighton, Ralph H. Minneapolis
Cremer, M. H. Red Wing

*Deceased

Crenshaw, J. L. Rochester
Cress, E. E. Boyd
Cress, P. J. Ellsworth
Crewe, J. E. Rochester
Critchfield, L. R. St. Paul
Crume, Geo. P. Minneapolis
Crump, J. W. St. Paul
Culligan, J. M. St. Paul
Culligan, Leo C. St. Paul
Cumming, J. F. Morris
Curtin, John F. Minneapolis
Cutts, George. Minneapolis
D'Arms, Harry Lee. Hector
Dack, Lloyd G. St. Paul
Dady, Elmer E. Minneapolis
Dahl, Elmer O. Minneapolis
Dahl, G. A. Mankato
Daignault, Oscar. Benson
Daniel, Donald H. Minneapolis
Daniel, Lewis M. Minneapolis
Daniels, Harry A. Rochester
Daniels, J. W. St. Peter
Daniels, L. E. Rochester
Danielson, K. A. St. Paul
Darling, J. B. St. Paul
Dart, Leslie O. Minneapolis
Daugherty, E. B. St. Paul
Daugherty, L. E. St. Paul
Davis, Austin C. Rochester
Davis, B. F. Duluth
Davis, F. U. Faribault
Davis, I. Grant. Peterson
Davis, Herbert. St. Paul
Davis, L. Thomas. Wadena
Davis, Thayer Clinton. Wadena
Davis, William. St. Paul
Davison, H. L. Rochester
Dawley, Walter Averill. Rochester
Dean, Benjamin F. Rochester
De Boer, Hermanus. Edgerton
De Carle, Donald W. Rochester
Decker, Walter J. Rochester
Dedolph, Karl. St. Paul
Delmore, J. L. Roseau
Delougherty, J. St. Paul
Dempsey, D. P. Kellogg
Denman, A. V. Mankato
Derauf, B. I. St. Paul
Desjardins, Arthur U. Rochester
Devereaux, T. J. Wayzata
Dewar, J. E. Minneapolis
Dezell, Earl R. Minneapolis
Deziel, G. H. Minneapolis
Dickson, Thos. H., Jr. St. Paul
Diehl, Harold S. Minneapolis
Diessner, H. D. Minneapolis
Disen, C. F. Minneapolis
Ditmeyer, L. M. G. Jasper
Ditmire, David C. Rochester
Dittman, Geo. C. St. Paul
Dixon, Claude F. Rochester
Dixon, Robert K. Rochester
Dodge, F. A. Le Sueur
Dohm, M. St. Paul
Dolan, C. P. Worthington
Dolder, F. C. Eyota
Doleman, Nathan F. Tintah
Doms, H. C. Slayton
Donald, Joseph M. Rochester
Donaldson, C. A. Mesa, Arizona
Donohue, Philip F. St. Paul
Doolittle, L. E. Duluth
Dordal, J. Sacred Heart
Dorge, Richard I. Minneapolis
Dornblaser, H. Bright. Minneapolis
Down, Howard I. Rochester
Dowsell, W. J. Kerkhoven
Doxey, G. L. Minneapolis
Doyle, J. B. Rochester
Doyle, L. O. Minneapolis
Drake, C. R. Minneapolis
Drake, Carl B. St. Paul
Drake, F. A. Lanesboro
Dredge, H. P. Sandstone
Dreisbach, N. Minneapolis
Drenning, F. C. Duluth
Drips, D. G. Rochester
Droegemueller, E. H. Rochester
Drought, W. W. Fergus Falls
Dubbe, F. H. New Ulm
DuBois, J. A. Sauk Center
DuBois, J. F. Sauk Center
Dudley, J. H. Windom
Duff, Edwin R. Minneapolis
Dulude, S. Dassel
Dumas, Alexander G. Minneapolis
Duncan, Henry. Marietta
Dungay, Neil S. Northfield
Dunlap, E. H. Minneapolis
Dunlap, H. F. Rochester
Dunlop, Alex. Crookston

Dunn, Geo. R. Minneapolis
Dunn, J. N. St. Paul
Dunne, Gerald P. St. Paul
Dunsmoor, F. A. Minneapolis
Durgin, F. L. Winnebago
Dutton, C. E. Minneapolis
Dworsky, Samuel D. Minneapolis
Earl, George A. St. Paul
Earl, Robert O. St. Paul
Eberlin, E. A. Glenwood
Eby, C. B. Spring Valley
Eckman, P. F. Duluth
Eckstein, A. W. Mankato
Edlund, G. St. Paul
Edstrom, Henry. Crookston
Edward, George. Canton
Edwards, Ralph T. Elysian
Egilsrud, Kristian. Minneapolis
Ehrenberg, C. J. Minneapolis
Ehrlich, S. Paul. Minneapolis
Eitel, Geo. D. Minneapolis
Ekblad, J. W. Duluth
Eklund, E. J. Norwood
Eklund, Wm. J. Duluth
Elias, F. J. Duluth
Ellingson, A. R. Detroit Lakes
Ellison, David E. Minneapolis
Ellison, Frank E. Monticello
Elsey, J. R. Glenwood
Ely, O. S. South St. Paul
Emerson, E. C. St. Paul
Emmerson, W. S. Mayer
Emmons, W. F. Rochester
Endress, E. K. St. Paul
Engberg, E. J. St. Paul
Engelhart, P. C. Minneapolis
Engstrand, Oscar J. Warren
Engstrom, Geo. F. Belgrade
Eppard, R. M. Cloquet
Erb, F. A. Minneapolis
Erdmann, C. A. Minneapolis
Erickson, L. G. Wood Lake
Erickson, J. L. Hendricks
Ericson, J. G. Minneapolis
Ericson, Swan. Le Sueur
Ernest, G. C. St. Paul
Ertel, E. Q. Ellendale
Eshelby, E. C. St. Paul
Esser, John. Perham
Estrem, C. O. Fergus Falls
Estrem, I. A. Hibbing
Eusterman, C. B. Rochester
Evans, Edward T. Minneapolis
Evars, Arrah B. Rochester
Ewing, C. F. Wheaton
Exley, E. W. F. Minneapolis
Fahey, E. W. St. Paul
Fansler, W. A. Minneapolis
Farabaugh, Charles L. Minneapolis
Farr, R. E. Minneapolis
Farrell, H. J. Rochester
Farriah, R. C. Sherburn
Faust, Louis S. Rochester
Fauster, John U., Jr. Rochester
Fauth, Karl J. Gaylord
Fawcett, A. Maxwell. Renville
Fawcett, C. E. Stewartville
Fawcett, Keith R. Duluth
Feeney, John M. Minneapolis
Fehland, Harold R. Rochester
Fenger, E. J. Oak Terrace
Ferguson, J. C. St. Paul
Ferreira, Gideon J. Duluth
Fetter, Mary. Winona
Figi, F. A. Rochester
Fink, Leo W. Minneapolis
Fink, Walter H. Minneapolis
Finney, W. P., Jr. Rochester
Fischer, H. P. Shakopee
Fischer, Mario McC. Duluth
Fischer, P. M. Shakopee
Fitzgerald, E. T. Morris
Fitzgibbon, T. G. Rochester
Fjelstad, C. Alford. Minneapolis
Flagstad, A. E. St. Paul
Fleischhauer, D. S. Wabasha
Flemming, A. S. Minneapolis
Fleming, James. Cloquet
Fleming, T. N. St. Cloud
Flinn, B. P. Redwood Falls
Flinn, T. E. Redwood Falls
Flora, A. O. Chicago City
Flores, O. T. Dodge Center
Flower, W. Z. Minneapolis
Fogarty, Chas. W. St. Paul
Foley, F. E. B. St. Paul
Folken, F. G. Albert Lea
Forbes, R. S. Duluth
Ford, Burton C. Marshall
Ford, Frances A. Rochester
Forrest, C. G. Clearbrook

Fortin, Harry J. Rochester
Fortney, A. C. St. Paul
Foshager, Henry T. Clara City
Foster, W. K. Minneapolis
Foster, Wilnot C. Rochester
Fowler, L. H. Minneapolis
Fox, Ben. Rochester
Fox, John M. Minneapolis
Franchere, F. W. Lake Crystal
Francis, David W. Morristown
Fredericks, George M. Minneapolis
Frederickson, Alice C. Lake Lillian
Frederickson, Guy U. Y. Lake Lillian
Freeborn, J. A. Fergus Falls
Freed, O. J. R. Cokato
Freeman, C. D. St. Paul
Freeman, Geo. H. St. Peter
Freeman, J. P. Albert Lea
Freeman, W. L. St. Cloud
Freligh, W. P. Albert Lea
French, H. S. Duluth
Frey, Robert E. Markville
Friedell, A. Rochester
Friesleben, Wm. Sauk Rapids
Frisch, F. P. Willmar
Fritsche, Albert. New Ulm
Fritsche, L. A. New Ulm
Froehlich, H. W. Thief River Falls
Frost, Harry T. Wadena
Frost, Russell H. Wabasha
Fugina, George R. Mankato
Fulcher, Oscar Hugh Rochester
Fulton, J. F. St. Paul
Funk, Victor K. Oak Terrace

Gaalaas, A. F. Wadena
Gaarde, F. W. Rochester
Gager, E. C. St. Paul
Gaines, E. C. Buffalo Lake
Gallagher, B. J. Waseca
Gamble, J. W. Albert Lea
Gamble, P. M. Albert Lea
Gamble, R. M. Albert Lea
Gammell, J. H. Minneapolis
Garand, J. H. Dayton
Garbrecht, Arthur. St. Paul
Gardiner, D. G. St. Paul
Gardner, Edwin L. Minneapolis
Gardner, V. H. Fairmont
Gardner, Walter P. St. Paul
Garlock, A. V. Bemidji
Garlock, Dewitt H. Bemidji
Gault, C. C. Owatonna
Geer, Everett K. St. Paul
Gehlet, J. N. St. Paul
Geist, Emil S. Minneapolis
Geist, George A. St. Paul
Gelz, J. J. St. Cloud
Gemo, Chas. Balaton
Ghent, Harry C. St. Paul
Ghent, M. M. St. Paul
Ghormley, Ralph K. Rochester
Ghormley, Mary C. Puposky
Christ, D. G. Rochester
Gibson, L. L. Lowry
Gibbons, Francis C. Comfrey
Giere, E. O. Minneapolis
Giere, J. C. Minneapolis
Giere, Richard W. Minneapolis
Giere, S. W. Benson
Giesen, A. F. Starbuck
Giesler, Paul W. Minneapolis
Giffin, H. Z. Rochester
Giffan, J. S. St. Paul
Gilles, F. J. Minneapolis
Gillespie, M. G. Duluth
Gillespie, N. H. Duluth
Gingold, Benjamin A. Minneapolis
Ginsberg, Harry. Minneapolis
Ginsberg, Wm. St. Paul
Giroux, A. A. Duluth
Girvin, R. B. Minneapolis
Goblirsch, A. P. Sleepy Eye
Goekerman, W. H. Rochester
Goehrs, H. W. St. Cloud
Goforth, Clifford. St. Peter
Goldberg, Isadore M. Minneapolis
Golden, C. M. Tyler
Goltz, E. V. St. Paul
Good, Louis P. Rochester
Gorder, Arne Christian. Rochester
Gosin, D. F. Minneapolis
Gosslee, G. L. Moorhead
Gowan, L. R. Duluth
Graham, David. Rochester
Graham, R. D. Duluth
Graham, Robert. Duluth
Grant, H. W. St. Paul
Gratzek, Frank R. Minneapolis
Gratzek, Thos. St. Paul

Grave, Floyd. Minneapolis
Graves, W. N. Duluth
Grawn, F. A. Duluth
Gray, F. D. Marshall
Gray, Howard Kramer. Rochester
Greeley, Horace, Jr. Rochester
Green, E. K. Minneapolis
Greene, Carl H. Rochester
Greene, W. P. Minneapolis
Greishmeier, Esther M. Minneapolis
Griffin, P. J. Fertile
Grimes, H. B. Madelia
Grinnell, W. B. Preston
Grise, W. B. Austin
Grogan, J. S. Wadena
Groschupf, Theo. Paul. Bemidji
Grose, Fredk. N. Clarissa
Gruenhagen, Arnold P. St. Paul
Gullixson, A. Albert Lea
Gunderson, Nels A. Minneapolis
Gustafson, H. T. Minneapolis

Habein, Harold C. Rochester
Haberman, E. Osakis
Hacking, Frank H. Minneapolis
Haddon, N. W. Minneapolis
Haessley, S. B. Faribault
Hagaman, Geo. K. St. Paul
Hagen, G. L. Minneapolis
Hagen, H. O. New Richland
Hagen, O. E. Butterfield
Hagen, Olaf J. Moorhead
Haggard, G. D. Minneapolis
Haines, J. H. Stillwater
Haines, S. F. Rochester
Halenbeck, Philip Luther. St. Cloud
Halgren, Harry A. Watertown
Hall, A. R. St. Paul
Hall, Andrea E. Virginia
Hall, Henry H. St. Paul
Hall, J. M. Minneapolis
Hall, S. S. Minneapolis
Hallberg, C. A. Minneapolis
Hallenbeck, D. F. Rochester
Hallowan, Walter. Jackson
Halper, Philip. St. Paul
Hamel, Arnold L. Minneapolis
Hamilton, A. S. Minneapolis
Hamlin, George B. Minneapolis
Hammermeister, Theodore F. New Ulm
Hammes, E. M. St. Paul
Hammond, A. J. Minneapolis
Hammond, J. F. St. Paul
Hand, John R. Rochester
Hand, W. R. Elbow Lake
Hane, Richard L. Rochester
Haney, C. L. Duluth
Hanlon, Frank R. Rochester
Hannah, Hewitt B. Minneapolis
Hansen, Arild E. Minneapolis
Hansen, Erling. Minneapolis
Hansen, M. Ada
Hansen, Olga S. Minneapolis
Hansen, Rorbye. Buhl
Hanson, A. M. Faribault
Hanson, H. J. Minneapolis
Hanson, H. V. Minneapolis
Hardeman, Daniel R., Jr. Rochester
Harmon, G. E. St. Paul
Hare, E. R. Minneapolis
Harriman, L. Howard Lake
Harrington, C. D. Minneapolis
Harrington, F. E. Minneapolis
Harrington, S. W. Rochester
Harris, C. Chisholm
Hart, Alfred B., Jr. Owatonna
Hartiel, Wm. F. St. Paul
Hartley, E. C., Jr. St. Paul
Hartman, Howard R. Rochester
Hartwell, Shattuck W. Muskegon, Michigan

Hartzell, John B. Rochester
Hartzell, Thos. B. Minneapolis
Haskell, A. D. Alexandria
Hassett, Roger G. Mankato
Hastings, D. R. Minneapolis
Hatch, W. E. Duluth
Hathaway, J. C. Minneapolis
Hathaway, S. J. Proctor
Hauge, M. M. Clarkfield
Hauser, V. P. St. Paul
Havens, Fred Z. Rochester
Havens, John G. W. Austin
Haverfield, Addie R. Minneapolis
Hawkins, V. J. St. Paul
Hawkinson, John P. Crosby
Hawkinson, L. F. Brainerd
Hawkinson, R. P. Minneapolis
Hayes, J. M. Minneapolis
Hayes, M. F. Nashwauk
Haynes, A. L. Faribault
Haynes, B. H. Butterfield

Hazeltine, M. E. Rochester
Haynes, M. H. Duluth
Head, Douglas P. Minneapolis
Head, G. D. Minneapolis
Healy, R. T. Pierz
Hearn, Wm. O. Minneapolis
Heath, A. C. St. Paul
Hebeisen, M. B. Carver
Heck, Frank Joseph. Rochester
Heck, Wm. W. St. Paul
Hedback, A. E. Minneapolis
Hedding, J. A. Minneapolis
Hedenstrom, F. G. St. Paul
Hedenstrom, L. H. Cambridge
Hefke, Hans W. Rochester
Hegge, O. H. Austin
Hegge, R. S. Fergus Falls
Heim, Russell R. Minneapolis
Heimark, J. H. Moorhead
Heimark, J. J. Fairmont
Heimark, O. E. Duluth
Heimdal, Clarence O. Rochester
Heise, W. F. C. Winona
Helk, H. W. Minneapolis
Heland, G. M. Spring Grove
Heland, J. W. Spring Grove
Helmholtz, H. F. Rochester
Hempstead, B. E. Rochester
Hemstead, Werner. St. Cloud
Hench, Philip S. Rochester
Henderson, A. J. Kiester
Henderson, M. S. Rochester
Hengstler, W. H. St. Paul
Henney, Wm. H. McIntosh
Hendrickson, J. F. Minneapolis
Hennricksen, H. G. Elkton
Henry, C. E. Minneapolis
Henry, Myron O. Minneapolis
Hensel, C. N. St. Paul
Henslin, A. E. Le Roy
Herbolsheimer, A. J. Minneapolis
Herbst, Wm. P. Minneapolis
Herman, Arthur L. Minneapolis
Hermanson, Peter E. Hendricks
Herrmann, Edgar T. St. Paul
Hertel, G. E. St. Paul
Hessgrave, S. S. St. Paul
Hewson, Wilfred J. Stillwater
Heyerdale, O. C. Rochester
Hiebert, J. P. Minneapolis
Hielscher, Helen H. Mankato
Hielscher, Julian A. Mankato
Higbee, Paul A. Minneapolis
Higgins, J. H. Minneapolis
Hilbert, Eunice. Minneapolis
Hilding, Anderson C. Duluth
Hilger, A. W. St. Paul
Hilger, D. D. St. Paul
Hilger, J. M. Iona
Hilger, L. A. St. Paul
Hill, Eleanor J. Minneapolis
Hill, Frederick C. Rochester
Hill, Frederick E. Duluth
Hillyard, Lorin Victor. Rochester
Hiniker, Peter J. Le Sueur
Hirschboeck, F. J. Duluth
Hirschfelder, A. D. Minneapolis
Hirschfield, Adolph. Minneapolis
Hirschfield, M. S. Duluth
Hirschfield, F. R. Minneapolis
Hitchings, W. S. Lakefield
Hoaglund, A. W. Minneapolis
Hobbs, C. A. Minneapolis
Hochfilzer, J. J. St. Paul
Hodapp, R. J. Willmar
Hodge, S. V. Minneapolis
Hodgson, H. H. Crookston
Hoff, Alfred. St. Paul
Hoffman, Max H. St. Paul
Hoidale, A. D. Tracy
Hoiland, A. S. Minneapolis
Holbrook, J. S. Mankato
Holcomb, J. T. St. Paul
Holcomb, O. W. St. Paul
Holderman, J. W. Duluth
Hoidridge, Geo. Foley
Holen, F. Minneapolis
Holl, P. M. Minneapolis
Holland, Wilbur W. Rochester
Hollands, W. H. Fisher
Holm, C. E. Isle
Holm, Geo. A. Minneapolis
Holm, H. H. Glencoe
Holmberg, L. J. Canby
Holmes, A. E. Rush City
Holmes, W. B. Ada
Holst, J. B. Little Falls
Holst, J. B. Little Falls
Holt, John E. St. Paul
Holt, Wm. B. Minneapolis
Holtan, Theodore. Waterville
Holte, H. Crookston

Hooke, J. A. Rochester
Horton, Bayard T. Rochester
Houkom, Biarne, Fergus Falls
House, Z. E. Cass Lake
Houston, C. A. Park Rapids
Hovde, Rolf, Winthrop
Howard, M. I. Mankato
Howard, William H. Minneapolis
Howard, W. S. St. Paul
Huenekens, E. J. Minneapolis
Huffington, H. L. Mankato
Hughes, Louis D. Minneapolis
Hullisick, H. E. St. Paul
Hullisick, Richard B. St. Paul
Hultkrans, Joel C. St. Paul
Hultkrans, R. E. Rush City
Humphrey, E. W. Moorhead
Humphrey, W. R. Stillwater
Hunt, F. N. Fairmont
Hunt, H. E. St. Paul
Hunt, R. C. Fairmont
Hunt, V. C. Rochester
Hunte, A. F. Truman
Hurd, Anna, Minneapolis
Hurt, Algernon S., Jr. Rochester
Hutchinson, Charles J. Minneapolis
Hutchinson, Henry, New London
Hutterer, Edw. G. Winsted
Huxley, Frederick R. Faribault
Hyde, Theodore L. Rochester
Hynes, Charles, Minneapolis
Hynes, James, Minneapolis
Hynes, John E. Minneapolis

Ide, A. W. St. Paul
Ikeda, Kano, St. Paul
Irvine, H. G. Minneapolis
Irwin, Alex F. Minneapolis

Jackson, C. M. Minneapolis
Jacobs, A. C. Elmore
Jacobs, Jno. C. Willmar
Jacobson, Clarence, Chisholm
Jacobson, David J. Blackduck
Jacquot, G. L. Marshall
Jamieson, Earl, Walnut Grove
Jennings, Frank L. Oak Terrace
Jennings, Mary H. Minneapolis
Jensen, A. H. Hutchinson
Jensen, Herman H. Atwater
Jensen, M. J. Minneapolis
Jensen, T. J. Duluth
Johnson, A. E. Minneapolis
Johnson, A. E. Red Wing
Johnson, A. E. Minneapolis
Johnson, Asa M. St. Paul
Johnson, C. M. Dawson
Johnson, E. W. Bemidji
Johnson, Ellsworth, Rochester
Johnson, H. M. Dawson
Johnson, H. P. Fairmont
Johnson, H. W. Rochester
Johnson, Hans, Kerkhoven
Johnson, Hartland C. St. Paul
Johnson, James A. Minneapolis
Johnson, Julius, Minneapolis
Johnson, Nimrod A. Minneapolis
Johnson, Norman, Minneapolis
Johnson, O. H. Echo
Johnson, O. V. Fergus Falls
Johnson, Odin J. Minneapolis
Johnson, R. A. Minneapolis
Johnson, Ray G. St. Paul
Johnson, Selmer M. Minneapolis
Johnson, T. H. St. Paul
Johnson, Verner P. Delano
Johnson, Walfred, Sauk Center
Johnson, Walter R. Rochester
Jones, A. W. Red Wing
Jones, D. C. St. Paul
Jones, E. M. St. Paul
Jones, G. M. Minneapolis
Jones, H. W. Minneapolis
Jones, Richard N. St. Cloud
Jones, W. A. Minneapolis
Jones, William R. Minneapolis
Jordan, Ferdinand M. Rochester
Josewich, Alexander, Minneapolis
Josewski, R. J. Stillwater
Joyce, George Leo, Stewartville
Joyce, G. A. Rochester
Judd, E. S. Rochester
Judge, Walter T. Graceville
Juergens, H. M. Belle Plaine
Juliar, R. O. St. Clair
Just, Herman J. Lafayette
Kaasa, L. J. Albert Lea

Kadesky, David, St. Paul
Kahala, Arthur, Crookston
Kalinoft, D., Stillwater
Kamman, Gordon R. St. Paul
Kamp, B. A. Albert Lea
Kannary, E. L. St. Paul
Kanne, C. W. Faribault
Karn, B. R. Ortonville
Kaufman, Wm. C. Appleton
Kaufman, A. J., Rochester
Keith, H. M. Franklin
Keith, N. M. Rochester
Kelby, G. M. Minneapolis
Kelling, Louis F. Lakefield
Kelly, B. W. Aitkin
Kelly, John V. St. Paul
Kelly, Paul H. St. Paul
Kelsey, C. G. Hinckley
Kemp, A. F. Mankato
Kemp, M. A. Fergus Falls
Kendahl, A. M. Jasper
Kennedy, C. C. Minneapolis
Kennedy, Jane F. Minneapolis
Kennedy, R. Roy, Minneapolis
Kennedy, Roger L. J. Rochester
Kennedy, W. A. St. Paul
Kenny, H. F. St. Paul
Kenyon, Paul, Wadena
Kepler, Edwin J. Rochester
Kerlan, M. Philadelphia, Pa.
Kern, M. J. St. Paul
Kernohan, James W. St. Paul
Kerschbaumer, Louisa, St. Peter
Kesting, Herman, St. Paul
Keyes, C. R. Duluth
Keyes, E. D. Winona
Keyes, J. D. Winona
Kibbe, O. A. Minneapolis
Kiefer, M. A. Sleepy Eye
Kierland, P. E. Alexandria
Kiesling, I. H. Nashauk
Kilbourne, A. F. Rochester
Kilbride, E. A. Worthington
Kilbride, J. S. Canby
Kilgore, G. L. Rochester
King, E. A. Minneapolis
King, George L. St. Paul
King, Harry T. Minneapolis
King, W. R. Minneapolis
King, Z. P. St. Paul
Kingsbury, E. M. Clearwater
Kinsella, Thomas J. Oak Terrace
Kintner, Arthur R. Rochester
Kirk, G. P. East Grand Forks
Kirklin, B. R. Rochester
Kistler, A. J. Minneapolis
Kistler, A. S. St. Paul
Kistler, C. M. Minneapolis
Kittelson, T. N. Fergus Falls
Klaveness, E. St. Paul
Klein, H. N. St. Paul
Klein, Harry, Duluth
Kliman, F. E. Duluth
Klima, W. W. Stewart
Knapp, F. N. Duluth
Knauff, M. K. St. Paul
Knight, Ray R. Minneapolis
Knight, Ralph T. Minneapolis
Koch, John C. Minneapolis
Koenigsberger, Charles, Mankato
Kohlbray, C. O. Duluth
Kohler, D. W. St. Joseph
Kohler, G. J. Minneapolis
Kolars, J. J. LeSueur Center
Koller, Herman M. Minneapolis
Koller, L. R. Minneapolis
Kolset, Carl D. Sanborn
Kooiker, Herman J. Milaca
Koop, S. H. Richmond
Kraft, Peter, Duluth
Krantz, C. I. Duluth
Kremer, Walter J. Minneapolis
Kreutzer, Titus C. Austin
Kriedt, Daniel, Minneapolis
Kucera, Frank J. Hopkins
Kucera, Wm. J. Minneapolis
Kuhlman, August, Melrose
Kumm, Frederick F. Wadena
Kuske, A. L. New Ulm
Kuth, J. R. Duluth
Kvitrud, G. St. Paul

Lacy, Nichols E. Rochester
Laird, A. T. Nopeming
Lajoie, John M. Minneapolis
Lamont, John C. Nopeming
Langenderfer, F. V. St. Paul
Langhoff, A. H. Glencoe
Lannin, J. C. Mabel
Lapierre, A. P. Minneapolis
Lapierre, C. A. Minneapolis
Lapierre, J. T. Minneapolis

Larsen, C. L. St. Paul
Larsen, O. O. Detroit Lakes
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Larson, Clarence M. Minneapolis
Larson, Lawrence M. Rochester
Larson, Leonard M. Oak Terrace
Laughlin, J. T. Grey Eagle
La Vake, R. T. Minneapolis
Law, A. A. Minneapolis
Lawrent, A. A. Minneapolis
Lax, Morris H. St. Paul
Lazar, H. L. Minneapolis
Leahy, Bartholomew, St. Paul
Learnmonth, James R. Rochester
Leavenworth, Richard O. St. Paul
Leavitt, H. H. Minneapolis
Lebowski, Joseph A. Minneapolis
Leck, Clifford C. Austin
Ledy, Eugene T. Rochester
Lee, H. M. Minneapolis
Lee, J. L. Watertown
Lee, W. A. Fergus Falls
Lee, Walter N. Madison
Leebens, J. H. Lismore
Leibold, H. H. Parkers Prairie
Leitch, Archibald, St. Paul
Leitch, N. M. Varrad
Leland, Harold R. Minneapolis
Leland, John T. Herman
Leland, M. N. Minneapolis
Lemon, W. S. Rochester
Lemstrom, Jarl, Minneapolis
Lenander, Melvin E. St. Peter
Lende, Norman, Faribault
Lenont, C. B. Virginia
Leonard, Gilbert J. St. Paul
Leonard, L. J. Minneapolis
Leopard, B. A. New Richmond
Lepa, F. J. Duluth
Lepak, John A. St. Paul
Lerche, William, Cable, Wis.
Leuty, Amos, Morris
Levin, Bert, St. Paul
Levine, N. M. Minneapolis
Levins, H. E. Askov
Lewis, A. J. Henning
Lewis, C. B. St. Cloud
Lewis, Charles F. Austin
Lewis, W. W. St. Paul
Lexa, F. J. Lonsdale
Libert, John N. St. Cloud
Lichtenstein, H. Winona
Lick, C. Louis, St. Paul
Liedloff, A. G. Mankato
Liffing, W. J. Goodhue
Lillehei, E. J. Minneapolis
Lillie, H. I. Rochester
Lillie, W. I. Rochester
Lima, Ludwig, Montevideo
Lind, C. J. Minneapolis
Lindahl, Merlyn J. Winthrop
Lindberg, A. L. Wheaton
Linde, Herman, Cyrus
Lindquist, R. H. Minneapolis
Lindsay, W. V. Winona
Lineberry, E. D. Rochester
Linner, H. P. Minneapolis
Linton, W. B. Minneapolis
List, Walter E. Minneapolis
Litchfield, John T. Minneapolis
Litman, Samuel N. Duluth
Little, W. J. St. Paul
Litzenberg, J. C. Minneapolis
Lloyd, H. J. Mankato
Lochead, Daniel C. Rochester
Locken, O. E. Crookston
Logan, A. H. Rochester
Logan, F. W. Blue Earth
Logeile, Rudolph C. Minneapolis
Lommen, A. P. Lanesboro
Lommen, P. A. Austin
Loney, W. R. Rochester
Long, Jesse, Minneapolis
Loofbourrow, Elias H. Keewatin
Loomis, E. A. Minneapolis
Loughery, Harold B. Rochester
Love, Fred A. Carlos
Love, I. G. Rochester
Lowe, Earl R. South St. Paul
Lowe, Thos. Pipestone
Lowe, Thomas A. South St. Paul
Luedke, G. H. Fairmont
Lum, C. E. Duluth
Lundgren, A. C. Minneapolis
Lundholm, A. M. St. Paul
Lundquist, E. F. Minneapolis
Lundy, John S. Rochester
Lynch, M. J. Minneapolis
Lynde, Orrin G. Thief River Falls
Lyng, John A. Minneapolis
Lyon, E. P. Minneapolis
Lyon, J. D. Minneapolis
Lysne, Henry, Minneapolis

*Deceased

| | | | | | |
|----------------------|---------------|-------------------------|-------------------|----------------------------|---------------------|
| McBeath, Ewing C. | New York City | Meinert, A. E. | Winona | Nickel, Allen A. C. | Rochester |
| McBride, William P. | Rochester | Melby, Benedik | Bloomington | Nickerson, W. S. | Faribault |
| McBroom, D. E. | Cambridge | Mellby, O. F. | Thief River Falls | Nippert, H. T. | St. Paul |
| McCarthy, Donald | Minneapolis | Melzer, G. R. | Lyle | Nordin, C. G. | St. Paul |
| McCarthy, W. J. | Madelia | Mercil, William F. | Crookston | Nordin, G. T. | Minneapolis |
| McCarthy, W. R. | St. Paul | Merkert, Charles E. | Minneapolis | Nordland, Martin | Minneapolis |
| McCartney, James S. | Minneapolis | Merkert, G. L. | Minneapolis | Norman, J. F. | Crookston |
| McCarty, Ray B. | Rochester | Merriman, L. L. | Duluth | Norment, William B. | Rochester |
| McCarty, P. D. | Ely | Mesker, G. H. | Olivia | Norris, Edgar H. | St. Paul |
| McCaughan, John M. | Rochester | Metheny, David | Rochester | Norris, G. H. | Annapdale |
| McClanahan, J. H. | White Bear | Meyer, A. A. | Melrose | Norton, Manville W. | Rochester |
| McClanahan, T. S. | White Bear | Meyer, E. L. | Minneapolis | Noth, H. W. | Minneapolis |
| McCloud, C. N. | St. Paul | Meyer, P. F. | Faribault | Novak, E. E. | New Prague |
| McComb, C. F. | Duluth | Meyerding, E. A. | St. Paul | Nunn, Leslie L. | Rochester |
| McCoy, Mary | Duluth | Meyerding, H. W. | Rochester | Nusbaum, D. H. | Jackson |
| McCrea, James | Fulda | Michael, J. C. | Minneapolis | Nutting, Roland E. | Rochester |
| McCuskey, Charles F. | Rochester | Michelson, H. E. | Minneapolis | Nye, Katherine A. | St. Paul |
| McDaniel, Orianna | Minneapolis | Miller, H. A. | Fairmont | Nye, Lillian L. | St. Paul |
| McDaniel, S. P. | Mountain Iron | Miller, V. I. | Mankato | | |
| McDonald, A. L. | Duluth | Miller, W. A. | New York Mills | O'Brien, H. J. | St. Paul |
| McDonnell, C. H. | Winona | Mills, J. L. | Winnebago | O'Brien, Wm. A. | Minneapolis |
| McDowell, J. P. | St. Cloud | Mills, Ralph G. | Rochester | O'Connor, D. C. | Eden Valley |
| McEachran, A. | Minneapolis | Mitchell, A. B. | Hector | O'Connor, J. P. | St. Paul |
| McFarland, A. H. | Minneapolis | Mitchell, R. S. | Grand Meadow | O'Connor, L. J. | St. Paul |
| McGandy, R. F. | Minneapolis | Moe, Russel J. | Duluth | O'Donnell, D. M. | Ortonville |
| McGeary, Geo. E. | Minneapolis | Moe, Thomas | Moose Lake | O'Donnell, J. E. | Minneapolis |
| McGiffert, E. N. | Duluth | Moen, J. K. Jr. | Minneapolis | O'Hara, J. J. | Janesville |
| McGroarty, J. J. | Easton | Moench, Mary | Rochester | O'Leary, P. A. | Rochester |
| McGuigan, H. T. | Red Wing | Moersch, F. P. | Rochester | Oberg, C. M. | Minneapolis |
| McHaffie, O. L. | Duluth | Moersch, H. J. | Rochester | Ochsner, Harold C. | Rochester |
| McHugh, Roderica F. | Aitkin | Moga, John A. | St. Paul | Oerting, Harry | St. Paul |
| McIntire, H. M. | Waseca | Mogilner, S. N. | St. Paul | Offutt, Susan R. | Rochester |
| McIntyre, Geo. | Minneapolis | Mohardt, John H. | Rochester | Ogden, Warner | St. Paul |
| McIntyre, John A. | Owatonna | Moir, Wm. W. | Minneapolis | Ohage, Justus | St. Paul |
| McIver, R. A. | Lowry | Molander, H. A. | St. Paul | Ohage, Justus Jr. | St. Paul |
| McKaig, Carl B. | Pine Island | Monahan, R. H. | Minneapolis | Ohlinger, L. B. | Chicago |
| McKechnie, Wilfred | St. Peter | Monroe, P. B. | Soudan | Ohlstadt, J. L. | McIntosh |
| McKenna, J. K. | Austin | Montgomery, Hamilton | Rochester | Oliver, C. H. | Graville |
| McKown, E. G. | Pipestone | Mooney, Leo P. | Marble | Olson, Albert E. | Duluth |
| McKeon, J. O. | Montgomery | Moore, A. B. | Rochester | Olson, Chas. A. | St. Paul |
| McKeon, James | St. Paul | Moorhead, M. B. | Minneapolis | Olson, Chester J. | Belle Plaine |
| McKibben, H. E. | St. Cloud | Moquin, Marie A. | St. Paul | Olson, Ernest A. | Pine Island |
| McKinlay, C. A. | Minneapolis | More, C. W. | Eveleth | Olson, F. A. | Minneapolis |
| McKinley, J. C. | Minneapolis | Morehead, D. E. | Rochester | Olson, Olaf A. | Minneapolis |
| McKinney, F. S. | Minneapolis | Moren, Edwin | Minneapolis | Olson, R. G. | Minneapolis |
| McLaren, Jennette M. | St. Paul | Morgan, Sherburn F. | Rochester | Olson, W. P. | Gaylord |
| McLaughlin, E. M. | Winona | Moriarty, Cecile R. | Minneapolis | Onsgard, L. K. | Houston |
| McNevin, C. F. | St. Paul | Mork, B. O. | Worthington | Oppegard, C. L. | Crookston |
| McNutt, John R. | Minneapolis | Morley, G. A. | Crookston | Oppegard, M. O. | Crookston |
| McPheeters, H. O. | Minneapolis | Morrison, A. W. | Minneapolis | Oredson, O. A. | Duluth |
| Macbeth, J. L. | St. Clair | Morrissey, F. B. | St. Paul | Orlob, W. M. | Jersey City, N. J. |
| MacDonald, A. E. | Minneapolis | Morrow, James J. | Austin | Ormond, Douglas | Waconia |
| MacDonald, D. A. | Minneapolis | Morsman, L. W. | Hibbing | Ortman, John W. | Pierz |
| MacDonald, Irving C. | Minneapolis | Morse, M. P. | Le Roy | Osburn, Burt F. | International Falls |
| MacFarlane, P. H. | Chisholm | Morris, C. R. | Zumbrota | Osborn, Lida | Mankato |
| MacF, Frank B. | Minneapolis | Mortenson, N. G. | St. Paul | Ostergren, E. W. | St. Paul |
| Macnie, John P. | Minneapolis | Morton, H. McI. | Minneapolis | Otto, H. C. | Frazee |
| Macnie, J. S. | Minneapolis | Morton, Herschel B. | Rochester | Overend, K. V. | Hallock |
| MacRae, Gordon C. | Duluth | Moses, Joseph Jr. | Northfield | Owre, Oscar | Minneapolis |
| Maertz, W. F. | New Prague | Moyer, Ralph E. | Bemidji | | |
| Magath, T. B. | Rochester | Moynihan, A. F. | Sauk Center | Page, R. L. | St. Charles |
| Magee, Henry R. | Rochester | Moynihan, T. J. | St. Paul | Palmer, B. M. | Rochester |
| Magie, W. H. | Duluth | Mroz, Rudolph J. | Rochester | Palmer, C. F. | Albert Lea |
| Magney, F. H. | Duluth | Mueller, S. C. | Rochester | Palmer, R. N. | Lanesboro |
| Mahorney, Howard R. | Rochester | Mulholland, Stanford W. | Rochester | Palmer, L. H. | Albert Lea |
| Mahowald, A. A. | Albany | Muller, R. Theo. | St. Paul | Paradis, W. G. | Crookston |
| Maitland, D. P. | Jackson | Murdoch, J. M. | Faribault | Parker, H. L. | Rochester |
| Major, S. G. | Rochester | Murphy, George T. | Rochester | Parker, O. W. | Ely |
| Maland, C. O. | Minneapolis | Murphy, Ignatius J. | Minneapolis | Parks, A. H. | Minneapolis |
| Malmgren, George E. | Rochester | Murray, D. D. | Duluth | Parrott, B. W. | Long Prairie |
| Manley, J. R. | Duluth | Mussey, R. D. | Rochester | Parson, L. R. | Elbow Lake |
| Mann, A. T. | Minneapolis | Myers, J. A. | Minneapolis | Partch, Wallace T. | Rochester |
| Manson, F. M. | Worthington | Myers, Thos. | St. Paul | Passer, A. A. | Olivia |
| Marclay, W. J. | Minneapolis | Myre, C. R. | Paynesville | Patterson, W. E. | Westbrook |
| Marcum, E. H. | Bemidji | | | Patterson, W. E. | Minneapolis |
| Margolis, Harry M. | Rochester | Nabers, L. W. | Rochester | Patterson, W. L. | Fergus Falls |
| Mariette, Ernest | Oak Terrace | Naegeli, A. E. | St. Paul | Paul, L. W. | Canby |
| Mark, D. B. | Minneapolis | Naegeli, Frank | Fergus Falls | Paulsen, E. L. | Minneapolis |
| Marken, M. H. | Fairmont | Nagel, H. D. | Waconia | Paulson, T. S. | Fergus Falls |
| Marshall, James M. | Rochester | Nass, H. A. | Mabel | Pearce, N. O. | Minneapolis |
| Martin, Edw. T. | Duluth | Nathanson, M. H. | Minneapolis | Pearson, William T. | Finlayson |
| Martin, W. C. | Duluth | Nauth, W. W. | Winona | Pedersen, A. H. | St. Paul |
| Martineau, J. L. | St. Paul | Neher, F. H. | St. Paul | Pederson, Harold | Minneapolis |
| Martinson, C. J. | Wayzata | Nelson, C. P. | Minneapolis | Pederson, O. J. | Hanska |
| Mason, J. B. | Rochester | Nelson, E. H. | Chisholm | Pederson, R. M. | Minneapolis |
| Masson, D. M. | Rochester | Nelson, Ernest J. | Owatonna | Pemberton, J. deJ. | Rochester |
| Masson, J. C. | Rochester | Nelson, H. E. | Crookston | Penhall, F. W. | Morton |
| Matchan, Glen R. | Minneapolis | Nelson, H. S. | Minneapolis | Pennie, D. F. | Duluth |
| Matthews, Justus | Minneapolis | Nelson, L. A. | St. Paul | Penny, L. E. | St. Paul |
| Mattill, P. M. | Oak Terrace | Nelson, M. S. | Granite Falls | Peppard, T. A. | Minneapolis |
| Mattison, P. A. | Winona | Nelson, Nesmith | Brainerd | Perley, A. E. | Philadelphia |
| Mattison, Hamline | Rochester | Nelson, O. E. | Minneapolis | Perry, C. G. | St. Paul |
| Maxeiner, S. R. | Minneapolis | Nelson, O. N. | Battle Lake | Perry, Ralph St. J. | Minneapolis |
| May, W. H. | Minneapolis | Nelson, R. L. | Duluth | Persons, C. E. | Marshall |
| Mayland, M. L. | Faribault | Nelson, Wallace I. | Underwood | Peters, R. M. | Minneapolis |
| Mayne, Roy M. | Duluth | Nelson, Wallace L. | Rochester | Petersen, J. R. | Minneapolis |
| Mayo, C. H. | Rochester | Nesbit, Mark Edwin | Rochester | Petersen, Thorvald | Minneapolis |
| Mayo, Charles W. | Rochester | Neseth, O. S. | Kenyon | Peterson, A. A. | Mora |
| Mayo, Joseph G. | Rochester | Nethercott, E. G. | Pine City | Peterson, Alfred | Dassel |
| Mayo, W. J. | Rochester | Neumann, C. A. | Lewiston | Peterson, Herbert W. | Minneapolis |
| Maytum, Charles K. | Rochester | New, G. B. | Rochester | Peterson, Joel A. | Rochester |
| Meckstroth, C. W. | Brandon | Newhart, Horace | Minneapolis | Peterson, Magnus Christian | St. Peter |
| Meierding, Wm. A. | New Ulm | Nicholson, M. A. | Duluth | Peterson, O. H. | Minneapolis |

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|------------------------|---------------|----------------------------|-----------------|-------------------------|-------------------|
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| Peterson, R. A. | Vesta | Robilliard, W. H. | Faribault | Shannon, W. Ray | St. Paul |
| Peterson, W. N. | St. Paul | Robinson, J. M. | Duluth | Shapiro, E. Z. | Crosby |
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| Pettit, L. J. | Minneapolis | Rochford, W. E. | Minneapolis | Shedlov, A. | Fosston |
| Pettit, Charles K. | Oak Terrace | Rodda, F. C. | Minneapolis | Sheedy, Chester L. | Austin |
| Pettit, C. W. | Minneapolis | Rodgers, C. L. | Minneapolis | Sheldon, W. D. | Rochester |
| Pfeffer, Theodore, J. | Rochester | Roehlke, A. B. | Elk River | Shelland, J. T. | Ada |
| Pfunder, M. C. | Minneapolis | Rosen, S. | Lakefield | Shellman, John L. | St. Paul |
| Phelps, Alvah G. | Minneapolis | Rosenberg, George C. | Minneapolis | Shelver, H. J. | Ortonville |
| Phelps, Kenneth A. | Minneapolis | Rosenberg, Maurice N. | Minneapolis | Sheppard, Fred. | Hutchinson |
| Phillips, A. E. | Delano | Rosenholtz, Burton. | St. Paul | Sheppard, P. E. | Hutchinson |
| Phillips, W. H. | Jordan | Rosenow, E. C. | Rochester | Sherman, C. L. | Luverne |
| Pierce, Chas. H. | Wadena | Rosenthal, Robert | St. Paul | Sherman, Carnot H. | Philadelphia, Pa. |
| Pierson, Claude M. | Wheaton | Rosenwald, R. M. | Minneapolis | Sherwood, G. E. | Kimball |
| Piper, M. C. | Rochester | Rothberg, J. C. | Springfield | Shillington, M. A. | St. Paul |
| Piper, Wm. A. | Mountain Lake | Rothrock, J. I. | St. Paul | Shrader, J. S. | Springfield |
| Platou, E. S. | Minneapolis | Rothschild, H. J. | St. Paul | Simson, C. W. | Hawley |
| Platt, F. Bertram | Battle Lake | Rousseau, Victor | Maple Lake | Simon, B. F. | St. Paul |
| Plondke, F. J. | St. Paul | Roust, H. A. | Montevideo | Simons, Bernard H. | Chaska |
| Plonske, C. J. | Faribault | Rowe, O. W. | Duluth | Simons, Edwin J. | Swanville |
| Plummer, H. S. | Rochester | Rowles, E. K. | Coleraine | Simons, Jalmar | Minneapolis |
| Plummer, J. W. A. | Rochester | Rowntree, L. G. | Rochester | Simpson, E. D. | Minneapolis |
| Poirier, J. A. | Forest Lake | Roy, J. A. | Red Lake Falls | Simpson, J. D. | Minneapolis |
| Pollard, D. W. | Minneapolis | Roy, Philemon | St. Paul | Sinamark, Andrew | Hibbing |
| Pollock, L. W. | Rochester | Ruby, Fred McK. | Hibbing | Siperstein, D. M. | Minneapolis |
| Polzak, Jacob A. | Minneapolis | Rucker, Charles W. | Minneapolis | Sivertsen, Ivar | Minneapolis |
| Poppe, Fred H. | Minneapolis | Rucker, William H. | Minneapolis | Skinner, H. O. | St. Paul |
| Porter, O. M. | Minneapolis | Rudell, Gustave | Minneapolis | Slater, S. A. | Worthington |
| Portmann, W. C. | Jackson | Rudie, P. S. | Duluth | Slocumb, J. A. | Plainview |
| Potter, Edith L. | Minneapolis | Ruedemann, Ehrhardt | Rochester | Slocum, Maude S. | Minneapolis |
| Powelson, H. C. | Duluth | Ruhberg, George N. | St. Paul | Slyfield, F. F. | Duluth |
| Power, J. E. | Duluth | Rumpf, C. W. | Faribault | Smallwood, J. T. | Worthington |
| Prangen, A. D. | Rochester | Rumpf, W. H. | Faribault | Smersh, J. F. | Owatonna |
| Pratt, Fred J. | Minneapolis | Rumpf, W. H. Jr. | St. Cloud | Smith, Arthur E. | Minneapolis |
| Pratt, J. A. | Minneapolis | Rutherford, W. C. | St. Paul | Smith, A. M. | Minneapolis |
| Preine, I. A. | Minneapolis | Rutledge, L. H. | Detroit Lakes | Smith, B. A. | Crosby |
| Prendergast, H. J. | St. Paul | Ryan, John J. | St. Paul | Smith, B. F. | Willmar |
| Prescott, Manfred U. | Rochester | Ryan, Mark E. | St. Paul | Smith, C. M. | Duluth |
| Prickman, Louis E. | Rochester | Ryan, W. J. | Duluth | Smith, C. E. | Bemidji |
| Priestley, J. T. | Rochester | Ryneanson, E. H. | Rochester | Smith, E. K. | Duluth |
| Priestley, Joseph B. | Minneapolis | Sadler, William P. | Minneapolis | Smith, F. D. | Kasson |
| Prim, J. A. | Winona | Saffert, Cornelius A. | New Ulm | Smith, F. L. | Rochester |
| Pritchard, D. B. | Winona | Sahr, W. G. | Hutchinson | Smith, Harry L. | Rochester |
| Proshek, Charles E. | Minneapolis | Salterman, B. I. | Minneapolis | Smith, Homer R. | Minneapolis |
| Puestow, Charles B. | Rochester | Sanderson, E. T. | Minneapolis | Smith, L. G. | Montevideo |
| Quinby, Thomas F. | Minneapolis | Sanford, A. H. | Rochester | Smith, Leonard Marshall | Rochester |
| Quist, H. W. | Minneapolis | Satersmoen, Theo. | Pelican Rapids | Smith, M. W. | Red Wing |
| Raadquist, C. S. | Hibbing | Sather, Allen | Fosston | Smith, Newton D. | Rochester |
| Radaabaugh, R. C. | Hastings | Satterlee, H. W. | Lewiston | Smith, Norman S. | Minneapolis |
| Radtke, H. P. | Rochester | Satterlund, Victor | St. Paul | Smith, P. A. | Faribault |
| Rains, J. M. | Willmar | Savage, F. J. | St. Paul | Smith, William M. | Rochester |
| Raiter, Franklin W. S. | Cloquet | Savatzky, Wm. A. | Minneapolis | Snell, Albert | Rochester |
| Raiter, Roy F. | Cloquet | Schaaf, E. H. K. | Minneapolis | Snyder, G. W. | St. Paul |
| Ramsey, W. R. | St. Paul | Schacht, Frederick William | Rochester | Soderlind, A. | Minneapolis |
| Randall, Lawrence M. | Rochester | Schaefer, Jos. F. | Rochester | Soderlind, Ragnar T. | Minneapolis |
| Rankin, F. W. | Rochester | Schaefer, S. | Winona | Sogge, L. | Windom |
| Ransom, M. L. | Hancock | Schaefer, Wesley G. | Minneapolis | Sohlberg, O. A. | St. Paul |
| Rapp, E. W. | Duluth | Schatz, F. J. | St. Cloud | Sohmer, A. E. | Mankato |
| Rasmussen, C. C. | Fertile | Scheldrup, N. H. | Minneapolis | Solhaug, S. B. | Minneapolis |
| Rathbun, A. M. | Rice | Scherer, C. A. | Duluth | Sommer, A. W. | Elmore |
| Rathbun, C. A. | St. Cloud | Scherer, Roland G. | Morgan | Souster, B. B. | St. Paul |
| Rebman, E. C. | Austin | Schlesselman, J. T. | Mankato | Spannuth, John Roy | Rochester |
| Reed, Chas. A. | Minneapolis | Schlutz, Frederic | Minneapolis | Sprafka, J. M. | St. Paul |
| Rees, S. P. | Minneapolis | Schmidt, Geo. F. | Minneapolis | Spicer, F. W. | Duluth |
| Regnier, E. A. | Minneapolis | Schmitt, P. A. | Good Thunder | Spratt, C. N. | Minneapolis |
| Reineke, George F. | New Ulm | Schmitt, A. F. | Minneapolis | St. Clair, G. G. | Duluth |
| Reiter, H. W. | Shakopee | Schmitt, O. J. | Sterling, Colo. | Stacy, L. J. | Rochester |
| Rempel, Dietrich D. | Brownston | Schneider, H. A. | Jordan | Stangl, Fred | St. Cloud |
| Rentschler, Edwin B. | Rochester | Schoch, J. L. | New Ulm | Stangl, Philip E. | St. Cloud |
| Replogle, W. H. | Wabasha | Schoch, R. B. | St. Paul | Stanley, C. R. | Worthington |
| Reuter, Maurice Jerome | Rochester | Scholpp, O. W. | Hutchinson | Stark, W. B. | Rochester |
| Reynolds, J. S. | Minneapolis | Schons, E. G. | St. Paul | Steffens, L. A. | Red Wing |
| Richards, E. T. F. | St. Paul | Schroeder, C. H. | Duluth | Steiner, I. W. | Winona |
| Richards, W. B. | St. Cloud | Schuld, F. C. | St. Paul | Stelter, Lloyd A. | Minneapolis |
| Richardson, Fred S. | Minneapolis | Schultz, J. A. | Albert Lea | Stemsrud, A. A. | Dawson |
| Richardson, Harold E. | St. Paul | Schultz, Albert G. | St. Paul | Stephan, E. L. | Hinckley |
| Richardson, W. J. | Fairmont | Schussler, Otto F. | Minneapolis | Stern, E. G. | St. Paul |
| Richdorf, L. F. | Minneapolis | Schutz, Elmer S. | Mountain Lake | Stern, O. W. | St. Paul |
| Ridgway, A. M. | Annapdale | Schwartz, Virgil J. | Minneapolis | Steven, Geo. | Byron |
| Ridgway, Alexander | Belgrade | Schwyzler, Arnold | St. Paul | Stevens, F. A. | Lake Elmo |
| Ridgway, Florence | Minneapolis | Schwyzler, Gustav | St. Paul | Stevens, R. B. | Rochester |
| Rieniets, John H. | Rochester | Schwyzler, Gustav | St. Paul | Stewart, John Alexander | Rochester |
| Riggs, C. E. | St. Paul | Scofield, C. L. | Benson | Stewart, Alexander | St. Paul |
| Rigler, Leo G. | Minneapolis | Scott, D. E. | Rochester | Stewart, A. B. | Owatonna |
| Rishmiller, J. H. | Minneapolis | Scott, F. H. | Minneapolis | Stewart, C. A. | Minneapolis |
| Risser, E. D. | Winona | Scott, R. A. | Detroit Lakes | Stewart, C. C. Jr. | Rochester |
| Ritchie, H. P. | St. Paul | Seashore, D. E. | Duluth | Stewart, Glendolyn | Faribault |
| Rivers, A. B. | Rochester | Seashore, Gilbert | Minneapolis | Stewart, Nelson | North Mankato |
| Rizer, R. I. | Minneapolis | Seham, Max | Minneapolis | Stewart, R. I. | Minneapolis |
| Roadman, I. M. | Ponsford | Seifert, Otto J. | New Ulm | Stierle, Adolph, Jr. | St. Paul |
| Roan, Carl M. | Minneapolis | Sellesseth, Iver | Minneapolis | Stillwell, W. C. | Mankato |
| Robb, Edwin F. | Minneapolis | Senkler, G. E. | St. Paul | Stinnette, S. E. | St. Paul |
| Robbins, C. P. | Winona | Senn, E. W. | Owatonna | Stolpestad, H. L. | St. Paul |
| Roberts, L. M. | Little Falls | Sessions, John C. | Minneapolis | Stommel, Joseph | Minneapolis |
| Roberts, W. B. | Minneapolis | Setzer, H. J. | St. Paul | Strachauer, A. C. | Minneapolis |
| Robertson, A. W. | Litchfield | Shaleen, A. W. | Hallcock | Strader, E. L. | Deerwood |
| Robertson, H. E. | Rochester | | | Strand, E. | Bayport |
| Robertson, J. B. | Cottonwood | | | Strathern, F. P. | St. Peter |
| Robertson, W. P. | Litchfield | | | Strathern, M. L. | Gilbert |
| | | | | Stratte, A. K. | Pine City |
| | | | | Stratte, Harold C. | Windom |

*Deceased

Stratte, J. J. Hallock
 Strobel, W. G. Duluth
 Strout, E. S. Minneapolis
 Strout, G. Elmer. Minneapolis
 Stryker, W. B. Plainview
 Stuart, A. B. Cloquet
 Stuhler, Louis C. Rochester
 Stuhr, J. W. Stillwater
 Sturre, J. R. Minneapolis
 Sturmanns, S. H. Erskine
 Sukelorth, L. A. Duluth
 Sundt, M. Minneapolis
 Sussex, Lloyd Thomas. Rochester
 Sutherland, C. G. Rochester
 Sutherland, H. N. Ely
 Sutton, Chas. S. St. Cloud
 Sutton, L. F. Mazeppa
 Swanson, Cephas. Minneapolis
 Swanson, Edwin O. St. Paul
 Swanson, John A. St. Paul
 Swanson, Roy E. Minneapolis
 Swart, H. A. Rochester
 Swartwood, F. A. Waseca
 Swedenburg, A. W. Thief River Falls
 Sweetman, R. H. Sauk Center
 Sweetser, H. B. Minneapolis
 Sweetser, H. B. Jr. Minneapolis
 Sweetser, Theodore. Minneapolis
 Sweitzer, S. E. Minneapolis
 Swendsen, J. G. St. Paul
 Swendsen, J. J. St. Paul
 Swennes, O. S. Wahnkon
 Swenson, A. O. Duluth
 Swenson, Charles. Braham
 Swenson, O. J. Waseca
 Swezey, B. F. Buffalo

Tuohy, E. L. Duluth
 Turnaciff, D. D. Minneapolis
 Turnbull, Robert. Fosston
 Tweedy, G. J. Winona
 Tyrrell, C. C. Minneapolis

Ude, Walter H. Minneapolis
 Ulrich, Henry L. Minneapolis
 Undine, Clyde A. Minneapolis
 Urberg, S. E. Duluth
 Urner, John A. Minneapolis

Vaaler, T. Cannon Falls
 Vadheim, Alfred L. Tyler
 Vait, James B. Henning
 Valentine, W. H. Tracy
 VanMeier, Henry. Stillwater
 VanSlyke, Chas. A. St. Paul
 VanValkenburg, B. F. Long Prairie
 VanValkenburg, F. W. Long Prairie
 Vanzant, Frances Ralston. Rochester
 Verbruggen, A. H. P. E. Rochester
 Vercellini, C. E. Duluth
 Vik, A. Elliott. Minneapolis
 Vik, Melvin. Onamia
 Vinson, P. P. Rochester
 Vivian, R. S. Hibbing
 Vogel, Joseph H. New Ulm
 Vogtel, Melvin A. Minneapolis
 VonderWeyer, Wm. St. Paul
 VonLackum, W. H. Rochester
 Voyer, Emile O. Minneapolis
 Vrooman, F. E. St. Francis

Waas, Charles William. St. Paul
 Wagener, H. P. Rochester
 Wahlquist, Harold F. Minneapolis
 Waldron, Carl W. Minneapolis
 Waldron, G. W. Rochester
 Walker, A. E. Duluth
 Walker, G. H. Winona
 Walker, Maurice Andrew. Rochester
 Walker, R. E. St. Paul
 Wall, C. R. Minneapolis
 Waller, Joseph D. Wilmont
 Walters, Waltman. Rochester
 Wangenstein, Owen H. Minneapolis
 Wanous, E. Z. Minneapolis
 Ward, A. W. Minneapolis
 Ward, Percy A. Minneapolis
 Warham, T. T. Minneapolis
 Warnock, R. W. St. Paul
 Warren, E. L. St. Paul
 Warren, F. S. Faribault
 Watkins, C. H. Rochester
 Watson, A. M. Royalton
 Watson, J. A. Minneapolis
 Watson, John D. Holdingford
 Watson, N. M. Red Lake Falls
 Watson, Sydney. Worthington
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 Webber, Edward E. Duluth
 Weber, H. M. Rochester
 Weber, M. L. Duluth
 Webster, H. E.* Duluth
 Webster, William W. Rochester
 Weir, J. D. Browns Valley
 Weir, J. F. Rochester
 Weirick, Howard R. Hibbing
 Weiser, Geo. B. New Ulm
 Weisman, S. A. Minneapolis
 Welch, M. C. St. Paul
 Wellbrock, Wm. Louis A. Rochester
 Wellcome, J. W. B. Sleepy Eye
 Welles, H. J. Minneapolis
 Wenner, W. T. St. Cloud
 Wentworth, A. J. Mankato
 Werner, O. S. Cambridge
 Westby, Magnus. Madison
 Westby, Nels. Madison
 Westerman, A. E. Montgomery

Westerman, F. C. Montgomery
 Wethall, A. G. Minneapolis
 Wetherby, Macnider. Minneapolis
 Weum, T. Wm. Minneapolis
 Wheeler, D. W. Duluth
 Wheeler, M. W. St. Paul
 Wheeler, Theodora. Rochester
 Whitacre, J. C. St. Paul
 Whitcomb, Ed. H. St. Paul
 White, J. H. Rochester
 White, J. S. St. Paul
 White, S. Marx. Minneapolis
 White, Willard D. Minneapolis
 Whitmore, Frank. St. Paul
 Widen, W. F. Minneapolis
 Wickman, F. H. Sleepy Eye
 Wiese, H. E. B. Minneapolis
 Wilbur, D. L. Rochester
 Wilcox, Arch A. Minneapolis
 Wilder, Robert L. Minneapolis
 Wilhelm, Charles Martell. Rochester
 Wilken, Paul A. Minneapolis
 Will, W. W. Bertha
 Wilkinson, Stella. Duluth
 Willcutt, Clarence. Minneapolis
 Williams, A. B. St. Paul
 Williams, Clayton. St. Paul
 Williams, H. L. Minneapolis
 Williams, Henry Lane, Jr. Rochester
 Williams, Leon A. Slayton
 Williams, Lowell E. Oak Terrace
 Williams, R. V. Rushford
 Williams, Robert. Minneapolis
 Williamson, George A. St. Paul
 Willis, F. A. Rochester
 Wilmot, H. E. Litchfield
 Wilson, L. B. Rochester
 Wilson, R. H. Winona
 Wilson, Warren. Northfield
 Wilson, W. E. Northfield
 Wilson, W. F. Lake City
 Wiltrout, J. Geo. Oslo
 Winnick, J. B. St. Paul
 Winter, J. A. Duluth
 Witham, C. A. Minneapolis
 Wittich, F. W. Minneapolis
 Wohlrahe, A. A. Minneapolis
 Wohlrahe, Clarence. Springfield
 Wohlrahe, E. J. Springfield
 Wold, K. C. St. Paul
 Wolner, Oscar H. St. Peter
 Woltman, H. W. Rochester
 Wood, Douglas F. Minneapolis
 Wood, H. G. Rochester
 Woodruff, C. W. Chatfield
 Woodworth, Elizabeth. Minneapolis
 Workman, H. M. Tracy
 Workman, W. G. Tracy
 Wray, W. E. Campbell
 Wright, C. B. Minneapolis
 Wright, Charles D'a. Minneapolis
 Wright, C. O. Laverne
 Wright, Franklin R. Minneapolis
 Wright, William C. Rochester
 Wunder, Henry E. Shakopee
 Wynne, H. M. N. Minneapolis

Yaeger, W. W. Ivanhoe
 Yesko, Stephan A. Rochester
 Ylvisaker, R. S. Minneapolis
 Yoerg, O. W. Minneapolis
 Young, T. O. Duluth
 Young, V. A. Duluth

Zachman, A. H. Melrose
 Zanger, Isabelle M. Minneapolis
 Zaworski, E. A. Minneapolis
 Zeien, Thos. North Branch
 Ziegler, Lloyd Hiram. Rochester
 Zillessen, Frederick O. Rochester
 Zimmerman, H. B. St. Paul
 Zinn, Charles J. Rochester
 Ziskin, Thomas. Minneapolis
 Zlatovski, Michael. Duluth

*Deceased

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